



Weatherford

**COMPACT PHOTO DENSITY
COMPENSATED NEUTRON
MICRORESISTIVITY LOG**

COMPANY				SHAKESPEARE OIL COMPANY, INC.			
WELL				OTTELEY #6-14			
FIELD				CHALK BUTTES			
PROVINCE/COUNTY				LOGAN			
COUNTRY/STATE				U.S.A. / KANSAS			
LOCATION				1920' FNL & 1600' FEL			
SEC 14	TWP 14S	RGE 32W	Other Services				
Latitude				MAI/MFE			
Longitude							
API Number		15-109-21305					
Permanent Datum GL, Elevation 2809 feet							
Log Measured From KB							
Drilling Measured From KB @ 10 feet							
Date	17-JUL-2014						
Run Number	ONE						
Service Order	7577-92797338						
Depth Driller	4530.00			feet			
Depth Logger	4527.00			feet			
First Reading	4508.00			feet			
Last Reading	3600.00			feet			
Casing Driller	264.00			feet			
Casing Logger	265.00			feet			
Bit Size	7.875			inches			
Hole Fluid Type	CHEMICAL						
Density / Viscosity	9.40 lb/USg		56.00 CP				
PH / Fluid Loss	9.50		11.20 ml/30Min				
Sample Source	MUD PIT						
Rm @ Measured Temp	0.72 @ 80.0			ohm-m			
Rmf @ Measured Temp	0.58 @ 80.0			ohm-m			
Rmc @ Measured Temp	0.86 @ 80.0			ohm-m			
Source Rmf / Rmc	CALC		CALC				
Rm @ BHT	0.53 @110.0			ohm-m			
Time Since Circulation	4 HOURS						
Max Recorded Temp	110.00		deg F				
Equipment / Base	13244		LIB				
Recorded By	JEFFREY RANDLE			ADAM SILL			
Witnessed By	TIM PRIEST						
JOB #	LB14-213						

BOREHOLE RECORD				Last Edited: 17-JUL-2014 11:28
Bit Size inches		Depth From feet		Depth To feet
7.875		264.00		4530.00
CASING RECORD				
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	264.00	24.00

REMARKS
- SOFTWARE ISSUE: WLS 13.08.2113.
- RUN ONE: MCG, MML, MDN, MPD, MFE, MAI RUN IN COMBINATION. - HARDWARE: DUAL BOWSPRING USED ON MDN. 0.5 INCH STANDOFF USED ON MFE. 0.5 INCH STANDOFF USED ON MAI.
- 2.71 G/CC LIMESTONE DENSITY MATRIX USED TO CALCULATE POROSITY.
- BOREHOLE RUGOSITY, TIGHT PULLS, AND WASHOUTS WILL AFFECT DATA QUALITY.
- ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST.
- TOTAL HOLE VOLUME FROM TD TO SURFACE CASING: 2065 CU.FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO 3600 FEET: 190 CU.FT.
- RIG: H-D DRILLING #2

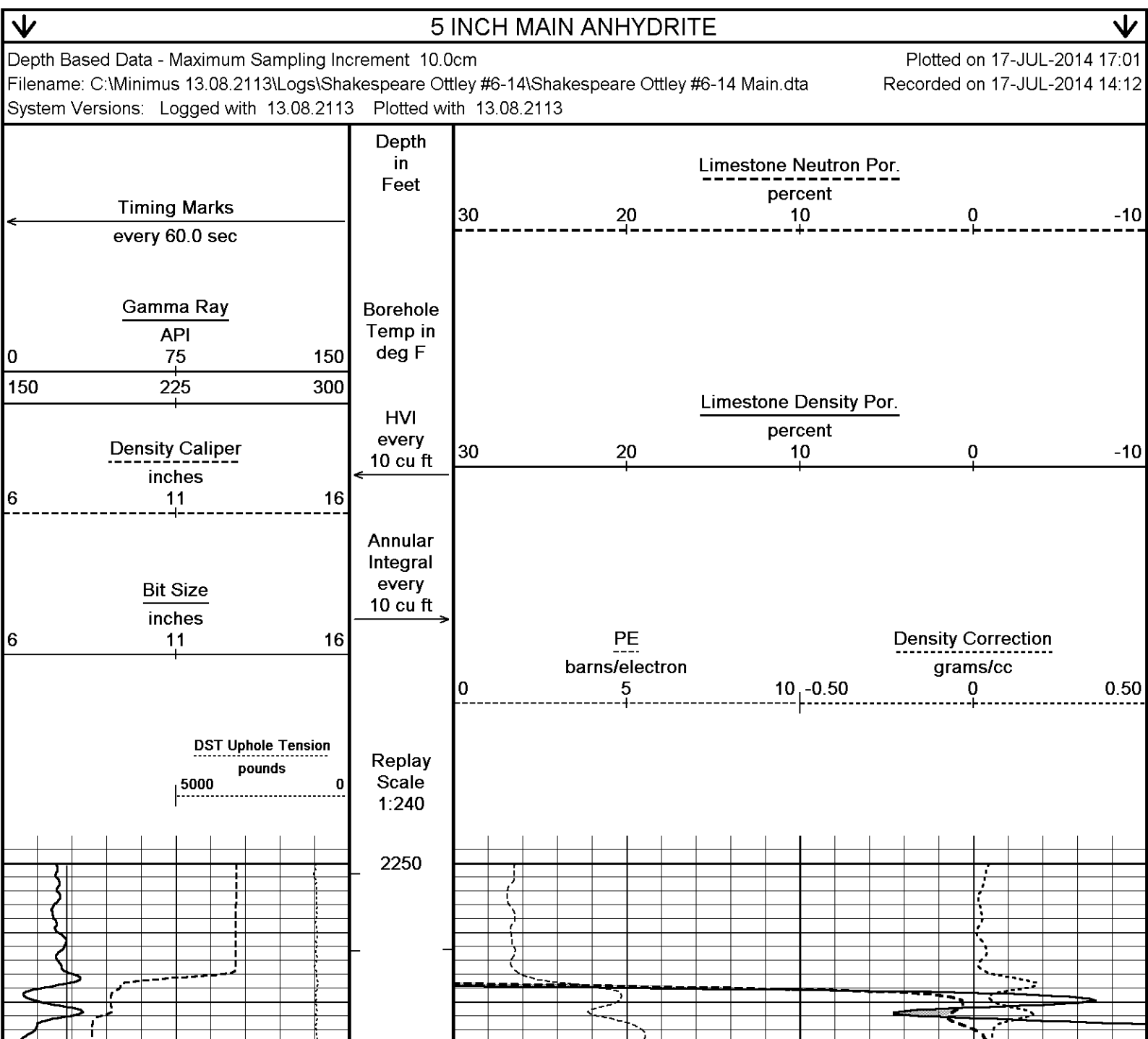
RIG: 11 D DRILLING #2.

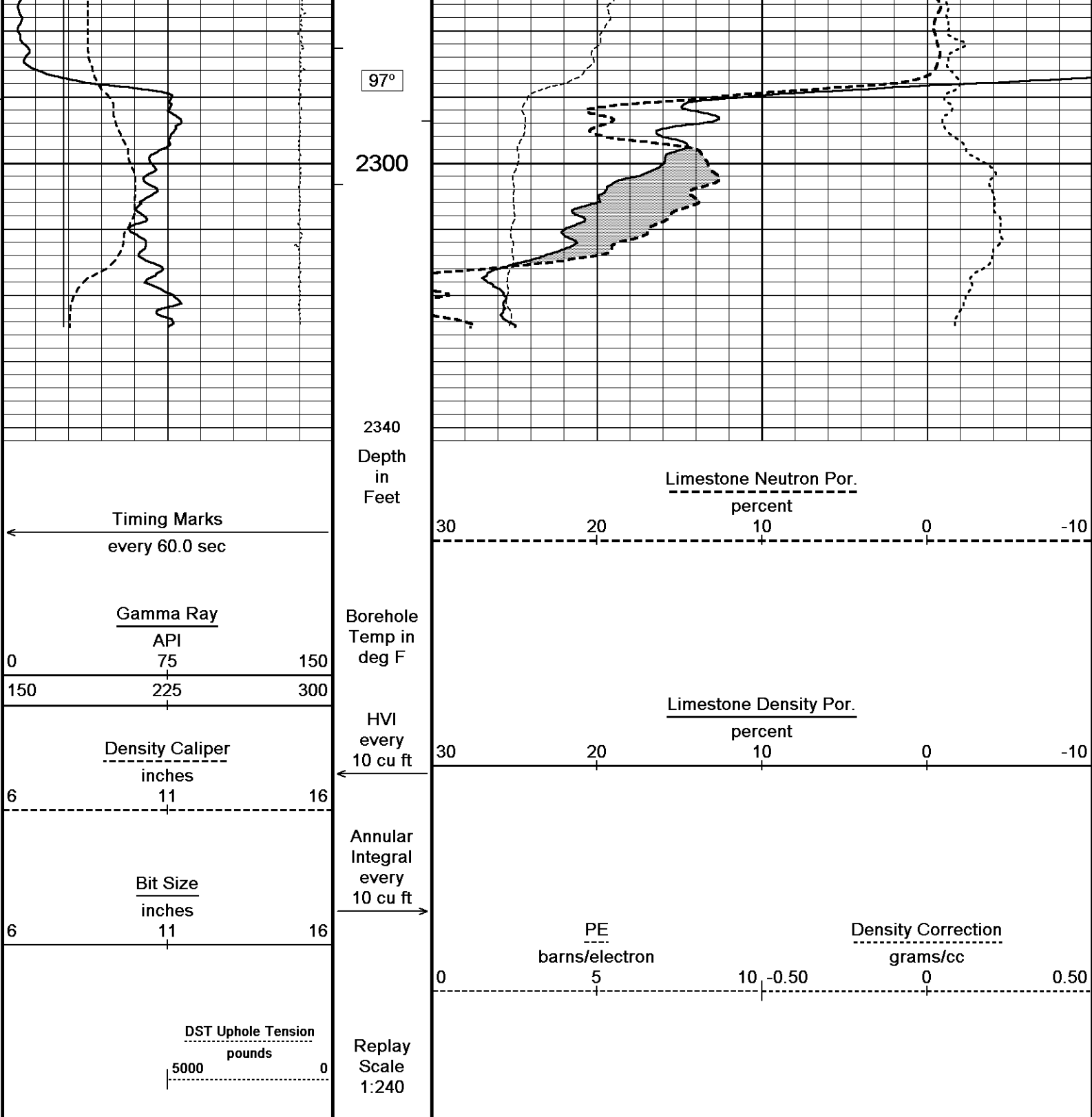
- ENGINEER: A. SILL.

- OPERATOR: N. ADAME, J. DUNLAP.

- JUNIOR FIELD ENGINEER: J. RANDLE.

In interpreting, communicating or providing information and/or making recommendations, either written or oral, as to logs or test or other data, type or amount of material, or Work or other service to be furnished, or manner of performance, or in predicting results to be obtained, the Contractor will give the Company the benefit of the Contractor's best judgment based on its experience and will perform all such Work in a good and workmanlike manner. Any interpretation of test or other data, and any recommendation or reservoir description based upon such interpretations, are opinions based upon inferences from measurements and empirical relationships and assumptions, which inferences and assumptions are not infallible, and with respect to which professional engineers and analysts may differ. ACCORDINGLY ANY INTERPRETATION OR RECOMMENDATION RESULTING FROM THE SERVICES WILL BE AT THE SOLE RISK OF THE COMPANY, AND THE CONTRACTOR CANNOT AND DOES NOT WARRANT THE ACCURACY, CORRECTNESS OR COMPLETENESS OF ANY SUCH INTERPRETATION OR RECOMMENDATION, WHICH INTERPRETATIONS AND RECOMMENDATIONS SHOULD NOT, THEREFORE, UNDER ANY CIRCUMSTANCES BE RELIED UPON AS THE SOLE OR MAIN BASIS FOR ANY DRILLING, COMPLETION, WELL TREATMENT, PRODUCTION OR FINANCIAL DECISION, OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY DRILLING ACTIVITY, DRILLING RIG OR ITS CREW OR ANY OTHER INDIVIDUAL. THE COMPANY HAS FULL RESPONSIBILITY FOR ALL DECISIONS CONCERNING THE SERVICES.



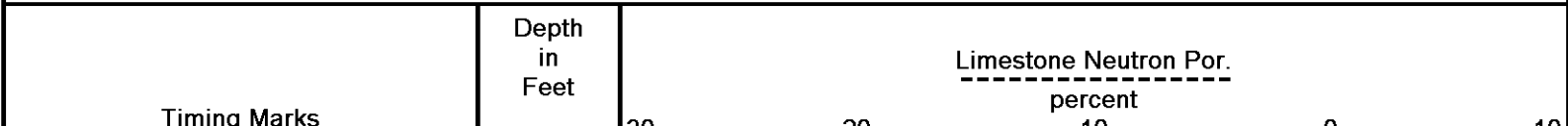


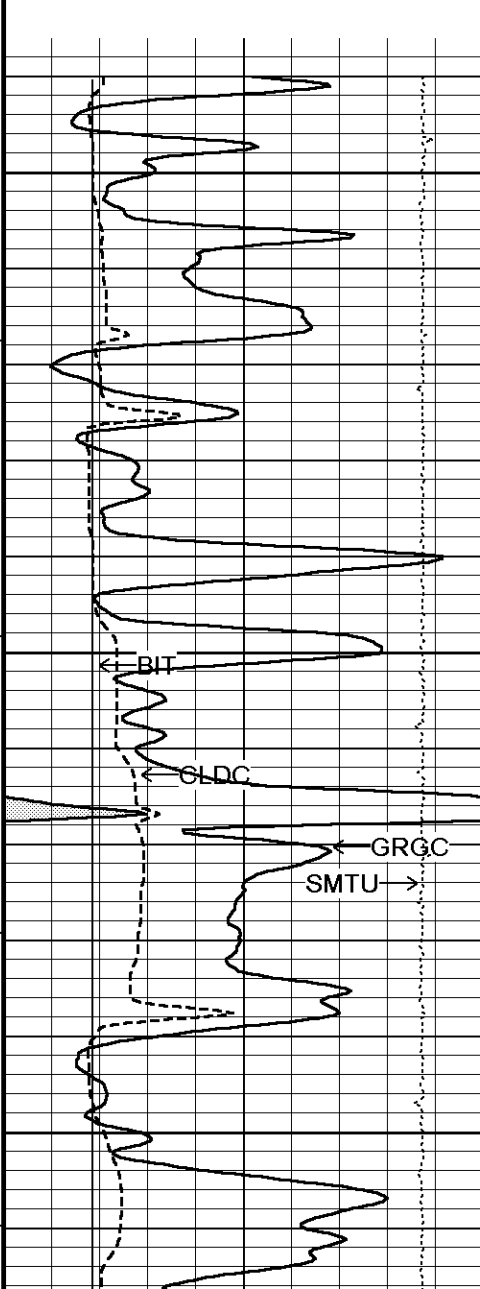
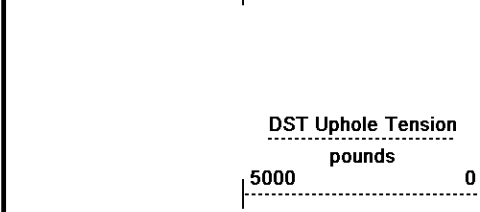
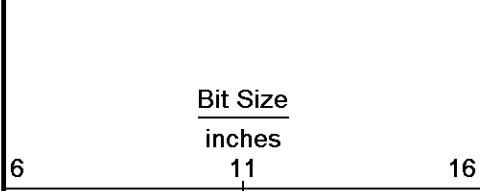
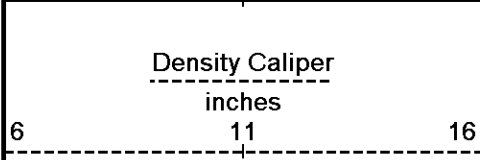
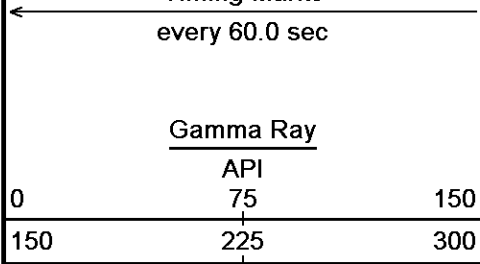
Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 17-JUL-2014 17:01
Filename: C:\Minimus 13.08.2113\Logs\Shakespeare Ottley #6-14\Shakespeare Ottley #6-14 Main.dta Recorded on 17-JUL-2014 14:12
System Versions: Logged with 13.08.2113 Plotted with 13.08.2113

↑ 5 INCH MAIN ANHYDRITE ↑

↓ 5 INCH MAIN LIMESTONE ↓

Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 17-JUL-2014 17:01
Filename: C:\Minimus 13.08.2113\Logs\Shakespeare Ottley #6-14\Shakespeare Ottley #6-14 Main.dta Recorded on 17-JUL-2014 14:12
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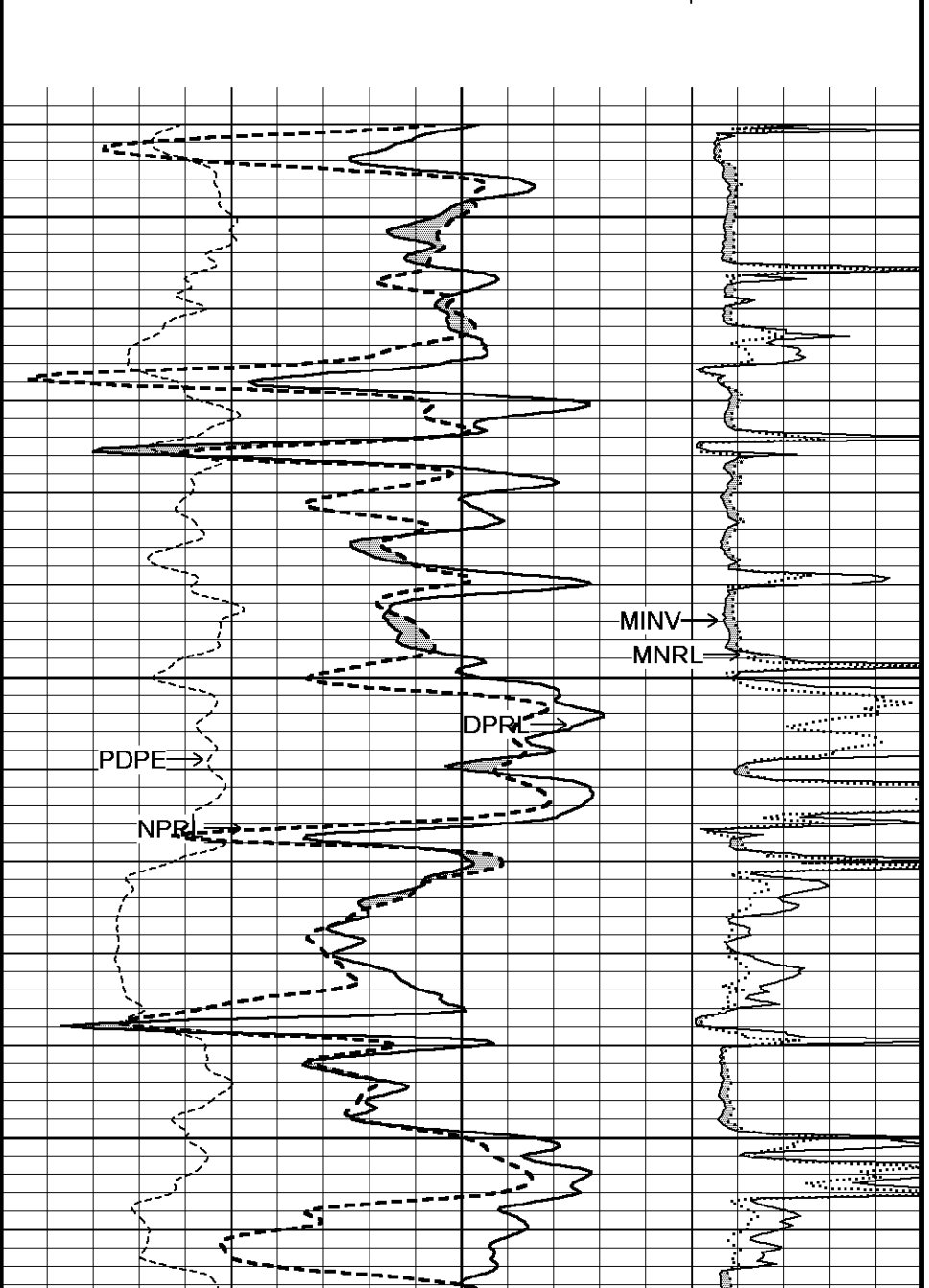
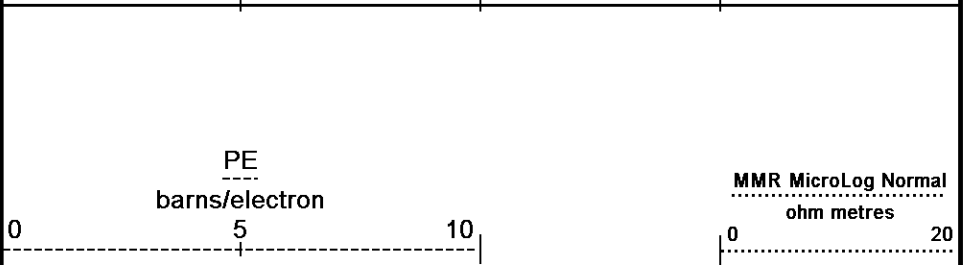
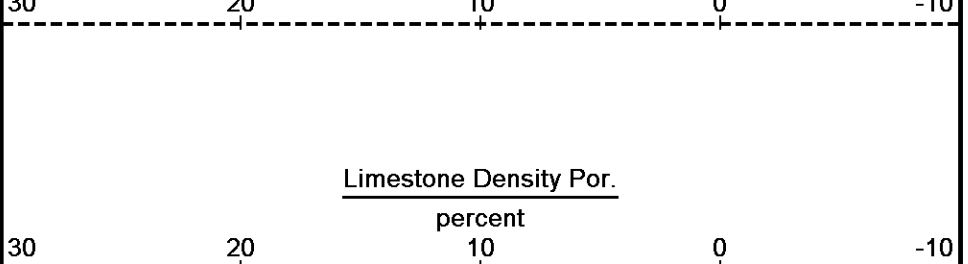
Borehole
Temp in
deg F

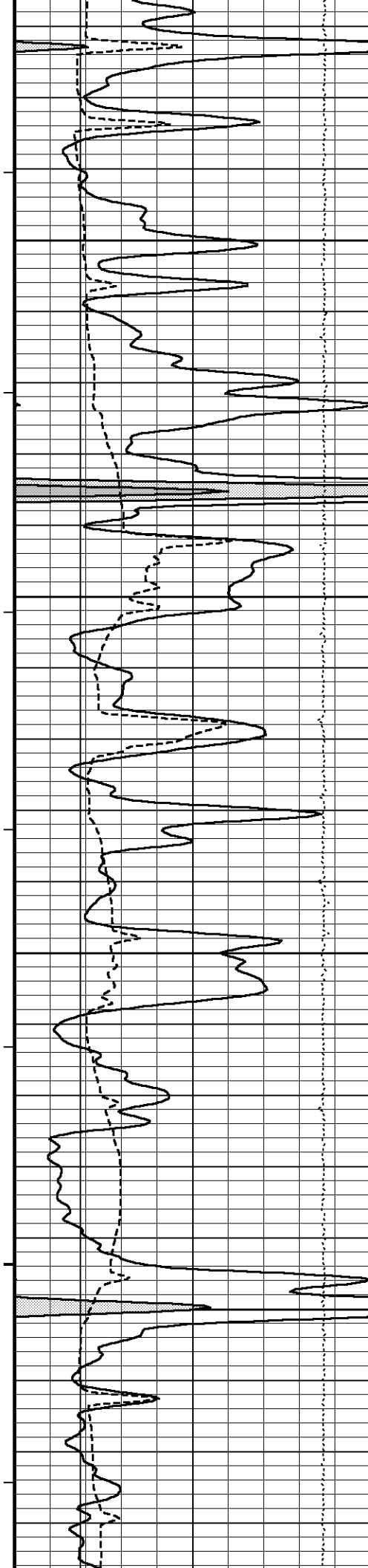
HVI
every
10 cu ft

Annular
Integral
every
10 cu ft

Replay
Scale
1:240

3588
3600
103°
3650
104°
3700
300





104°

3750

104°

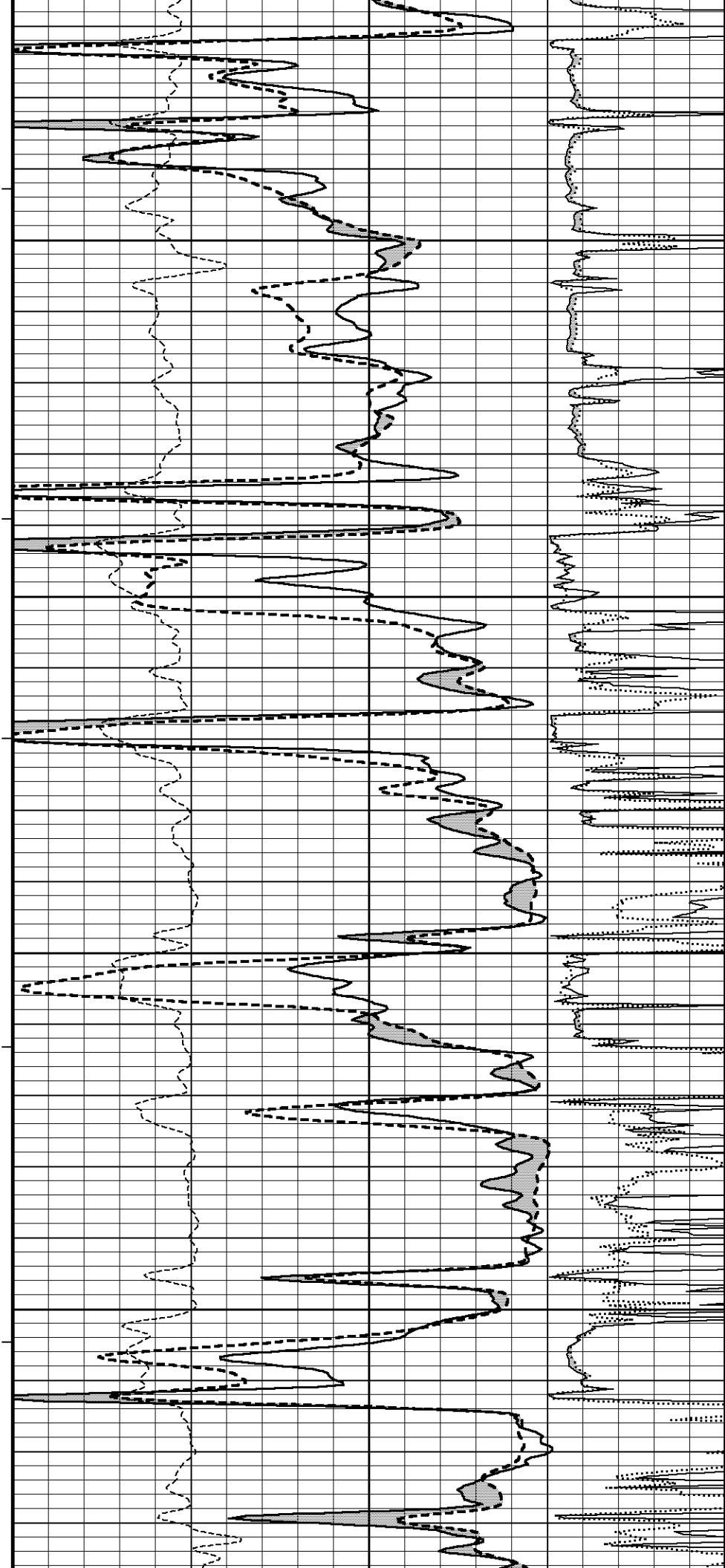
3800

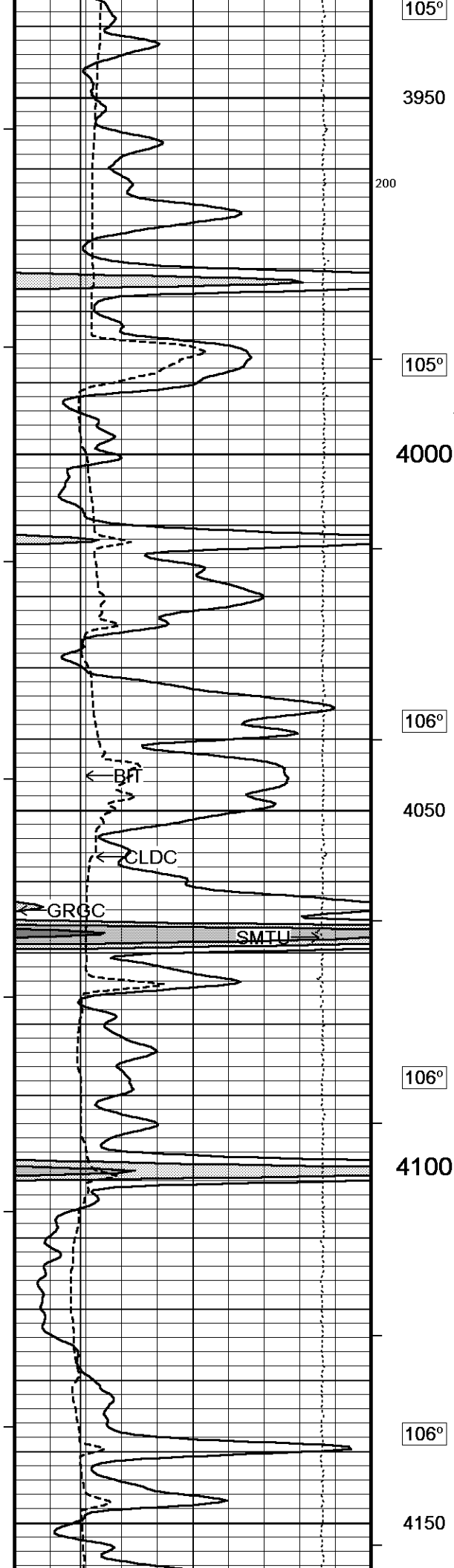
105°

3850

105°

3900





105°

3950

200

105°

4000

106°

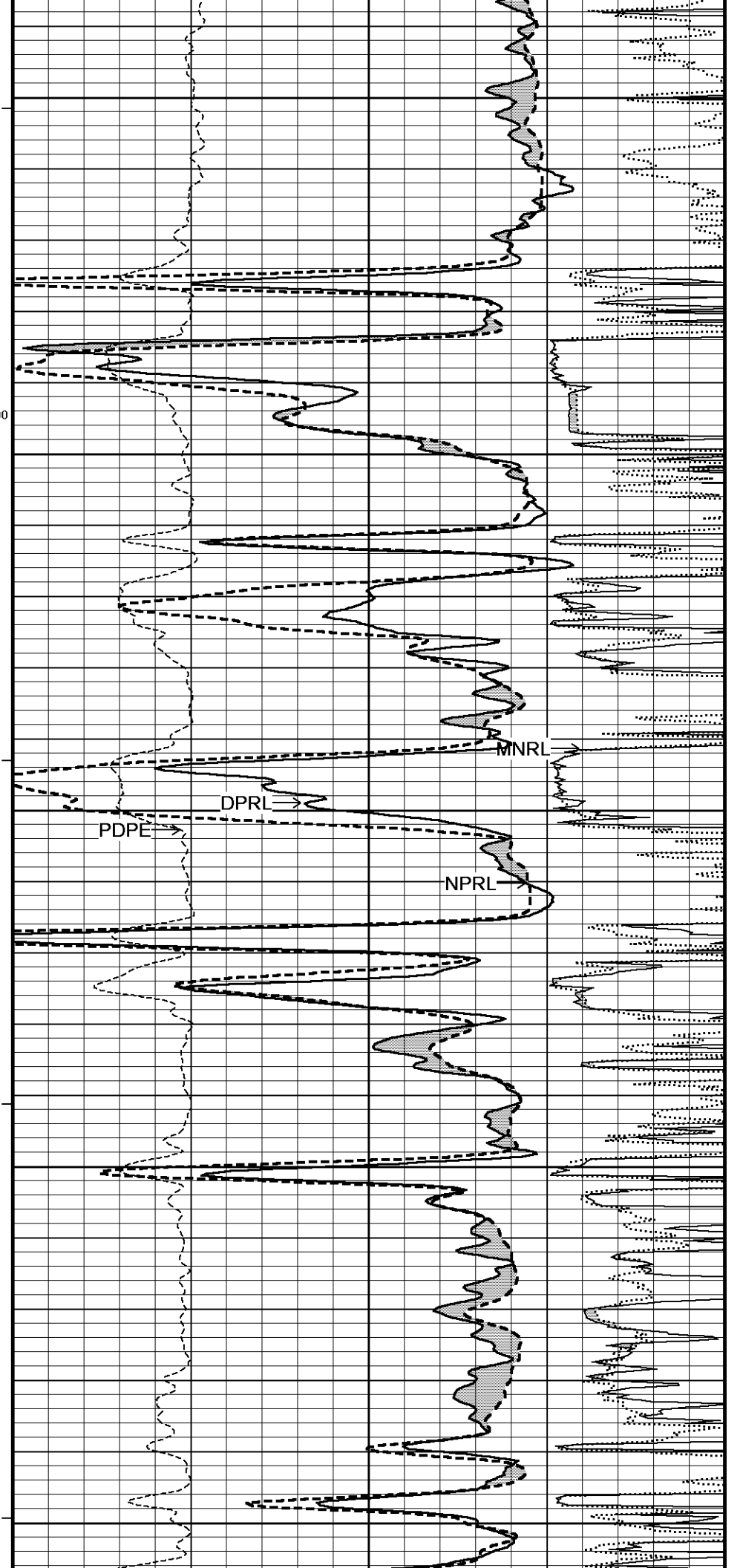
4050

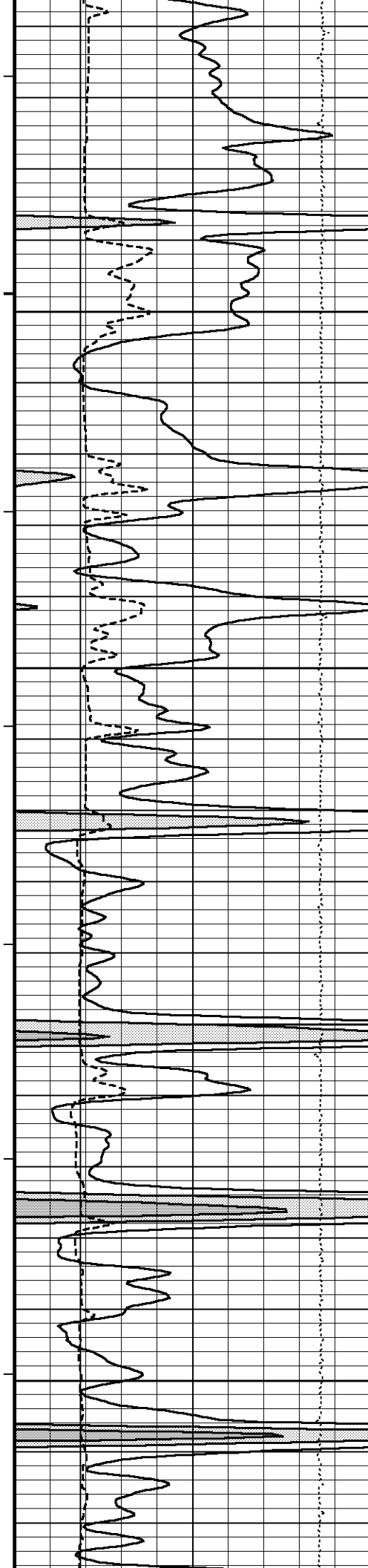
106°

4100

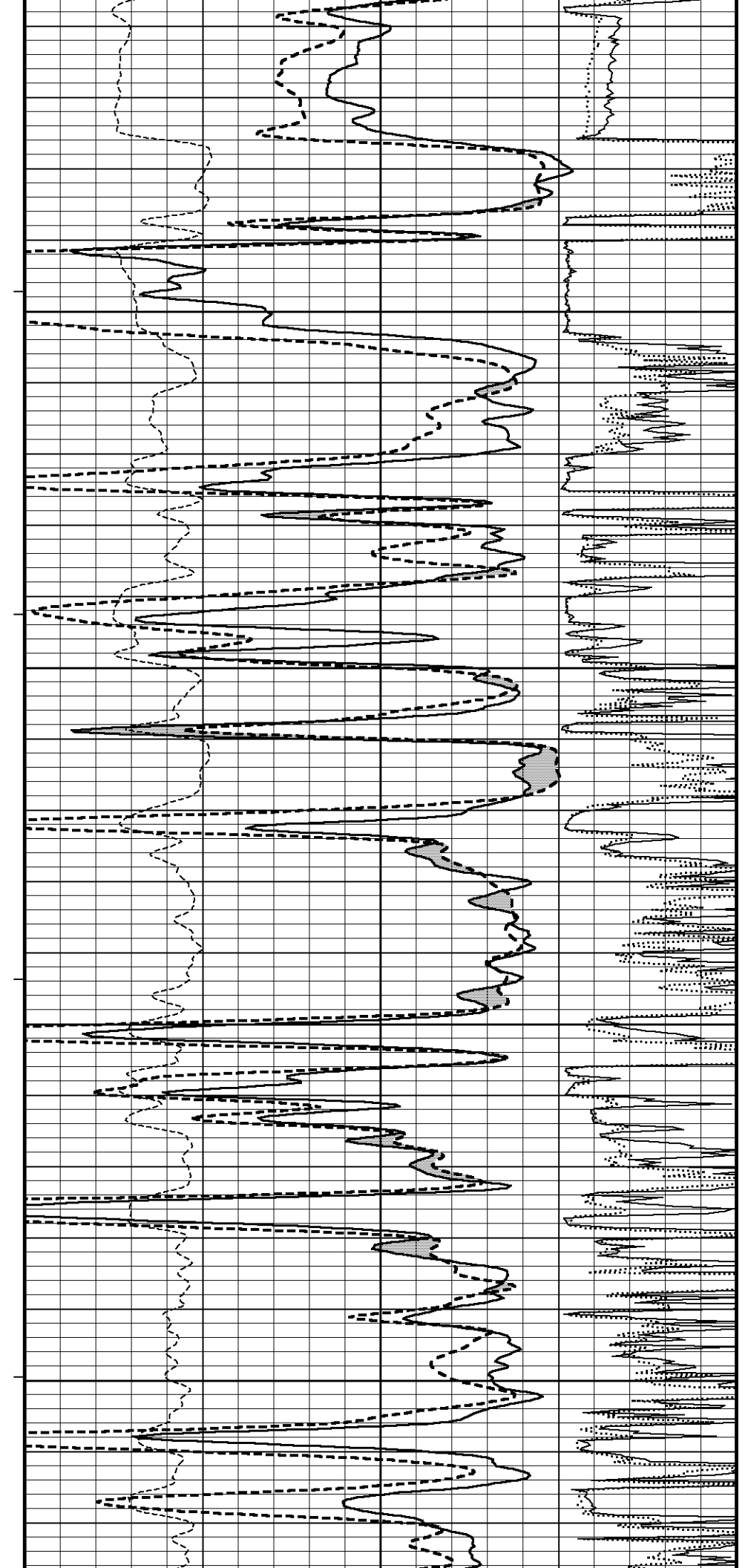
106°

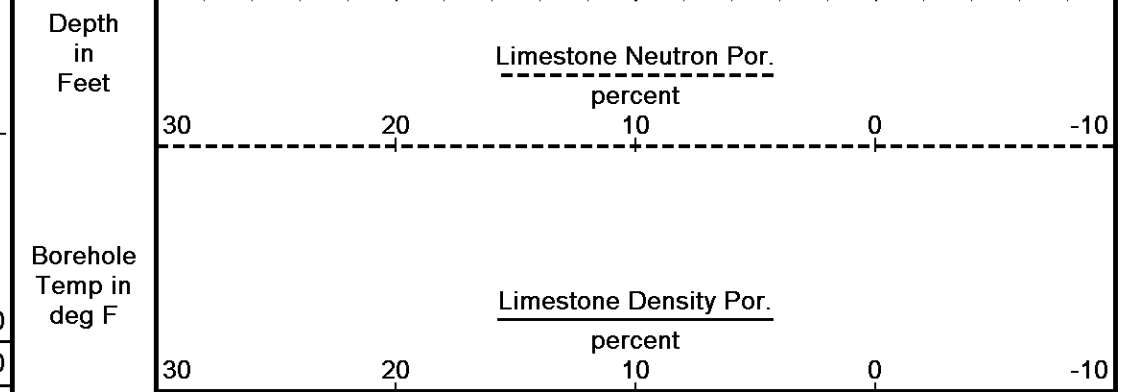
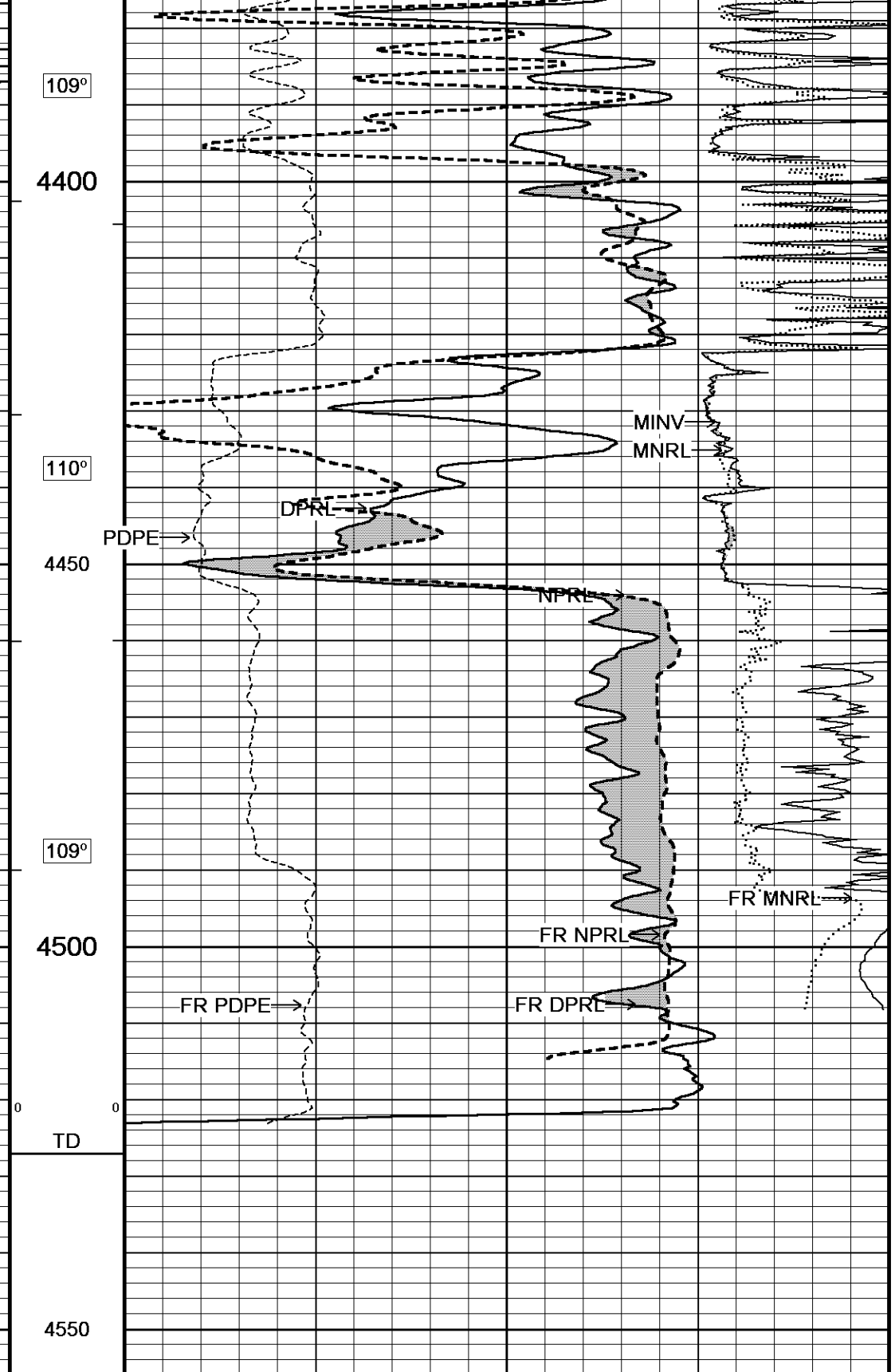
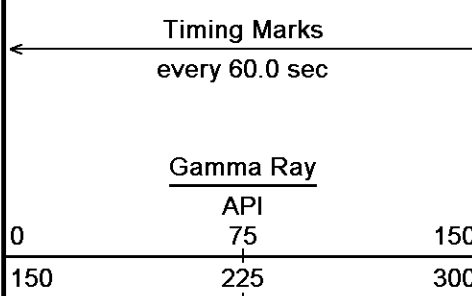
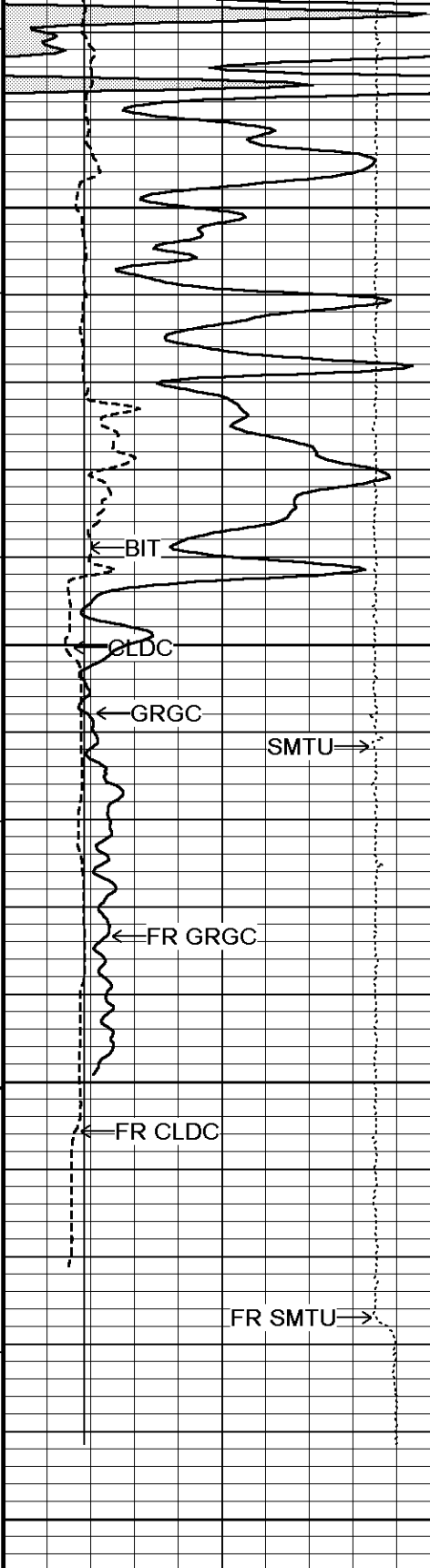
4150

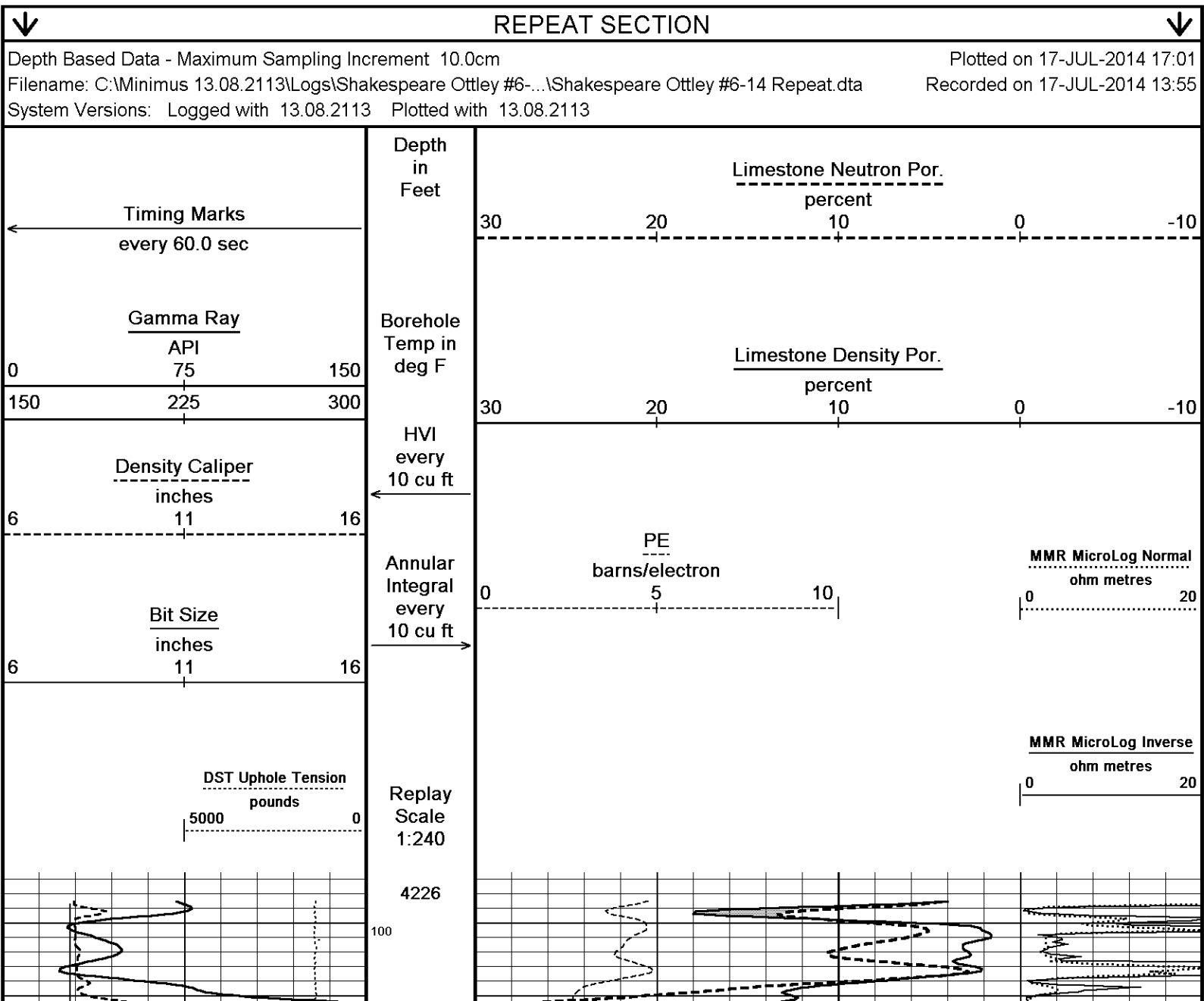
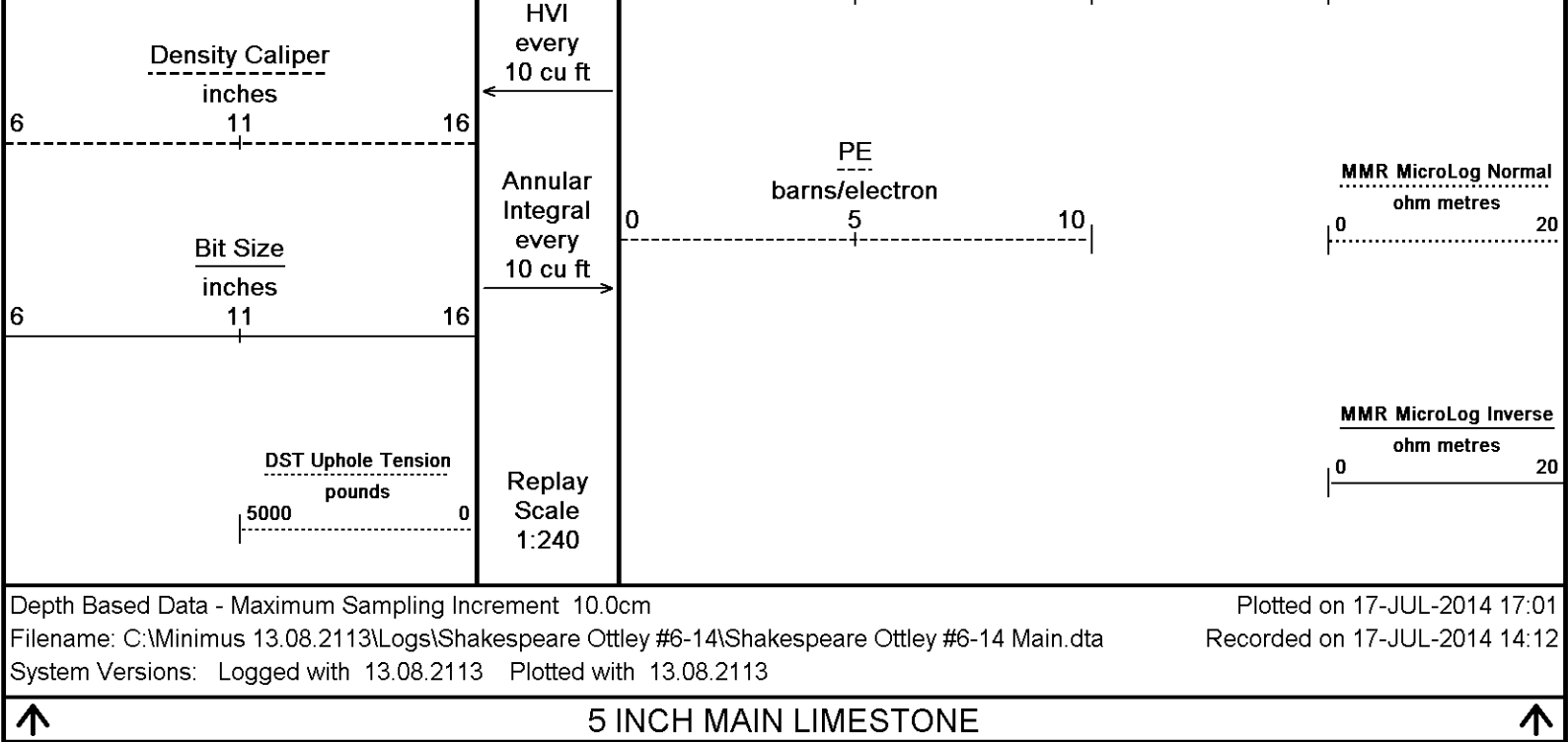


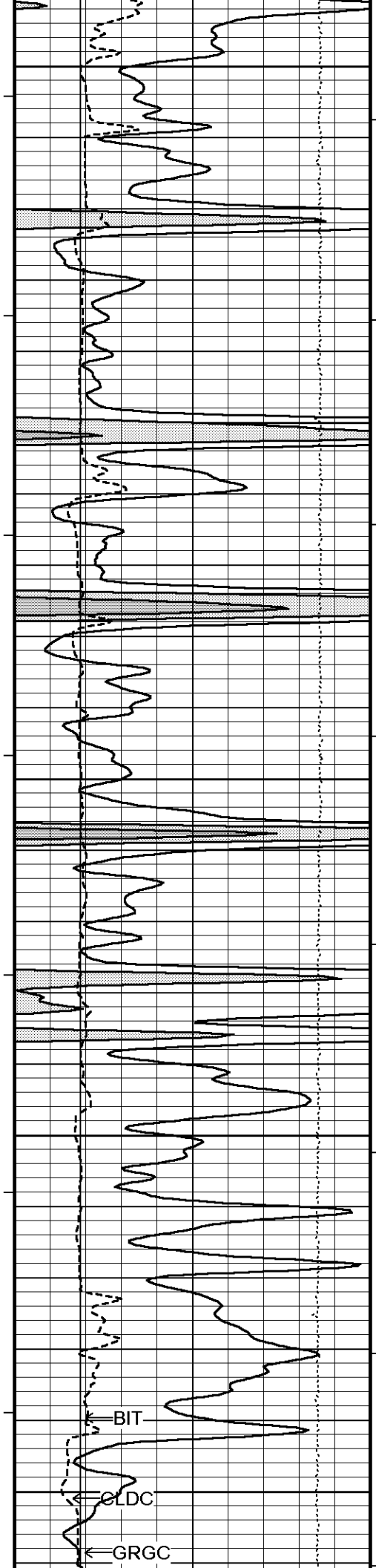


106°
4200
100
107°
4250
107°
4300
108°
4350

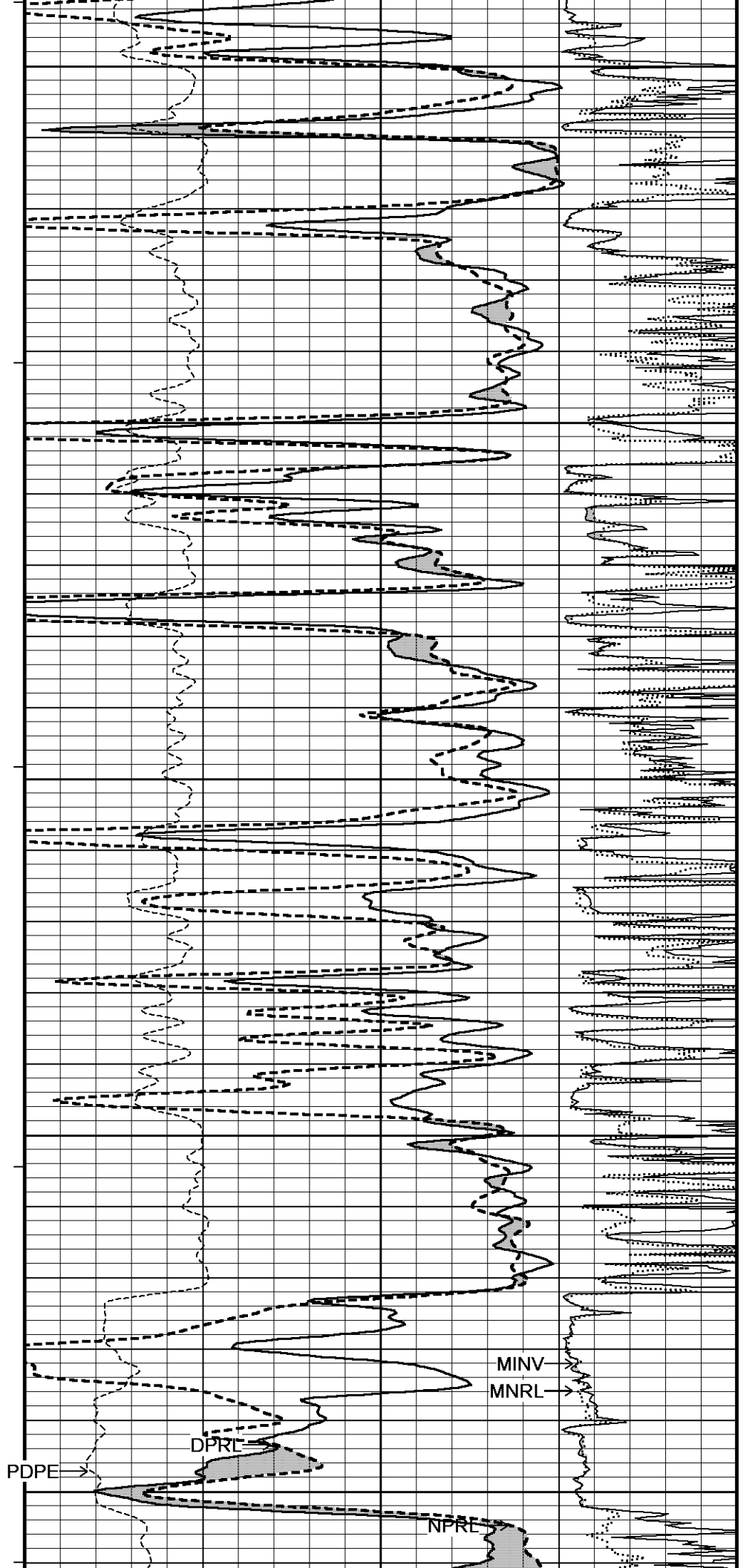


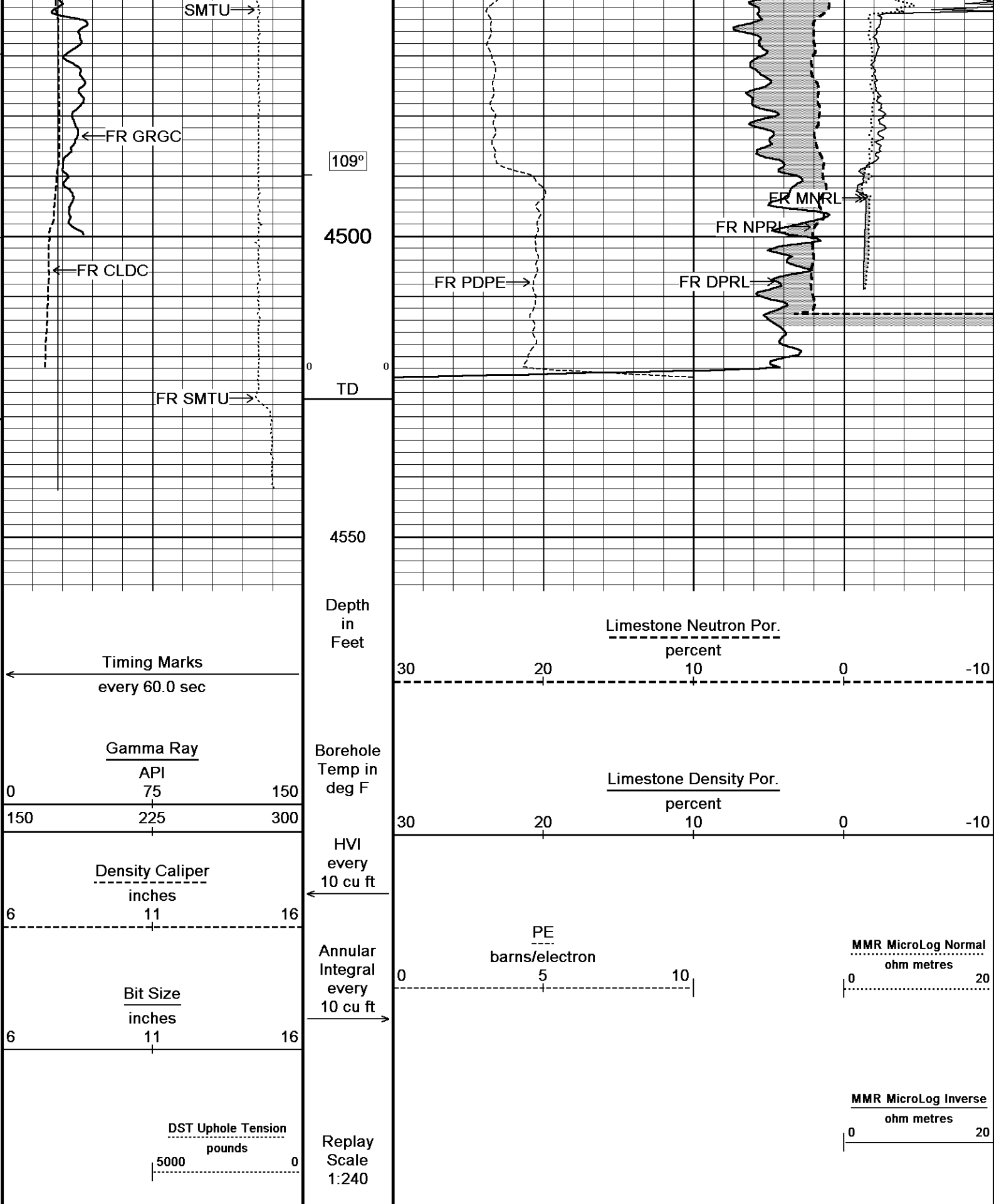






4250
106°
4300
107°
4350
108°
4400
109°





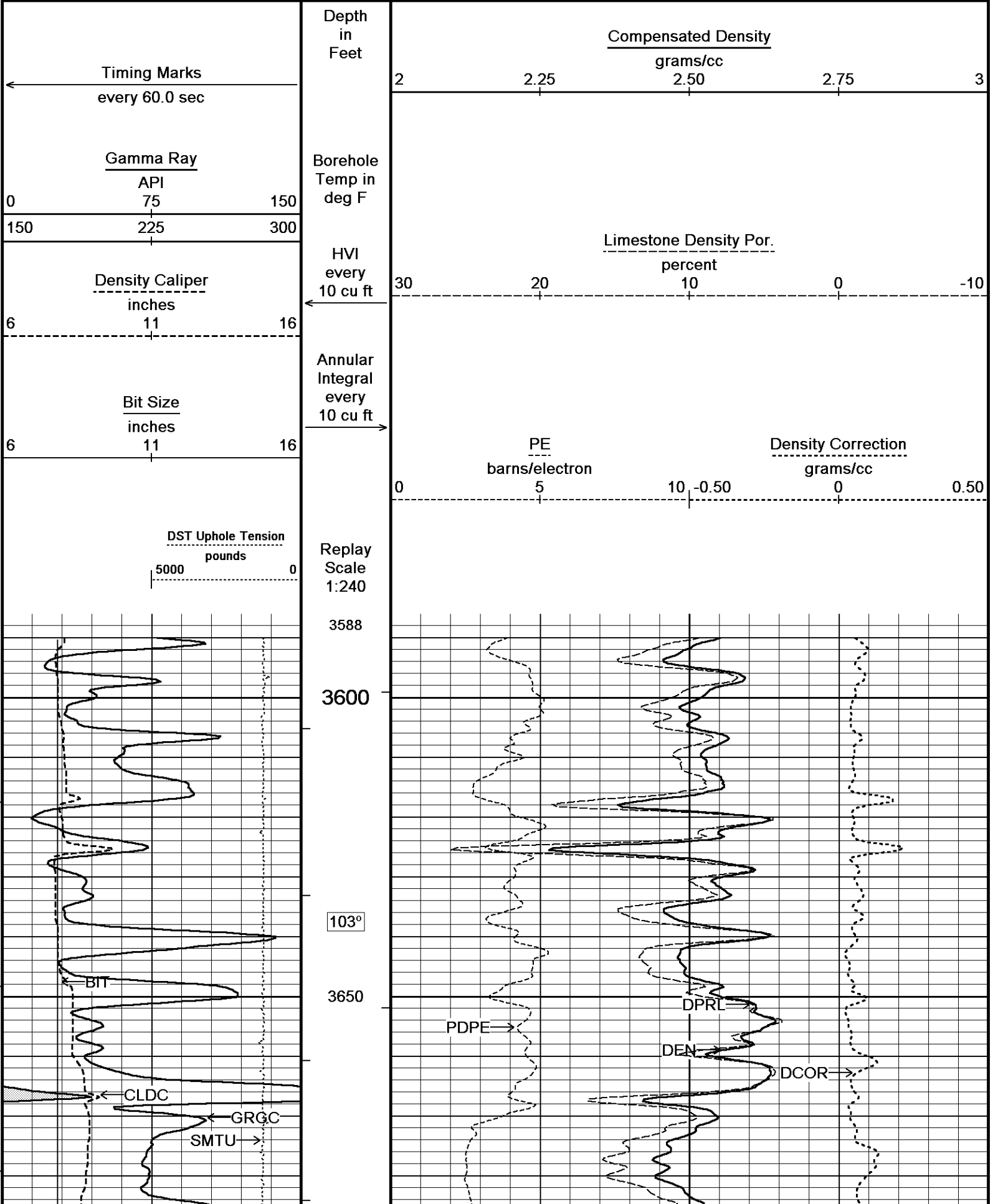
Depth Based Data - Maximum Sampling Increment 10.0cm

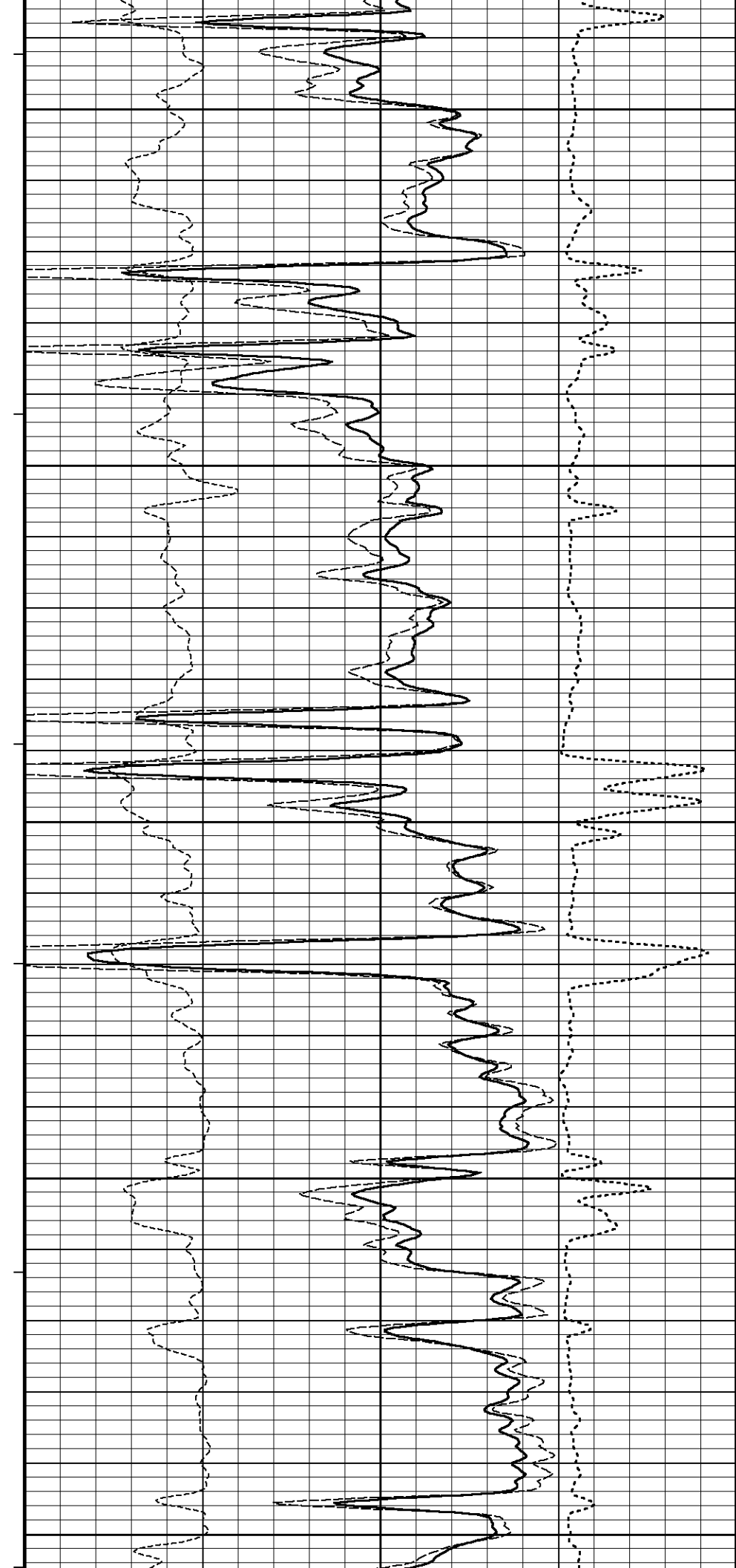
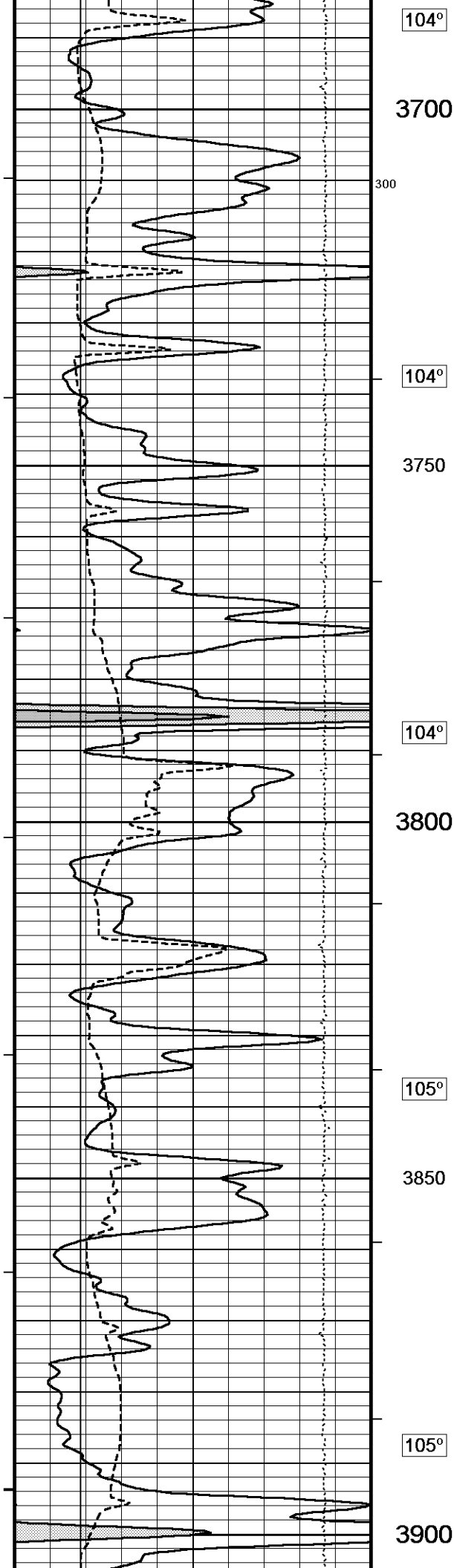
Plotted on 17-JUL-2014 17:01

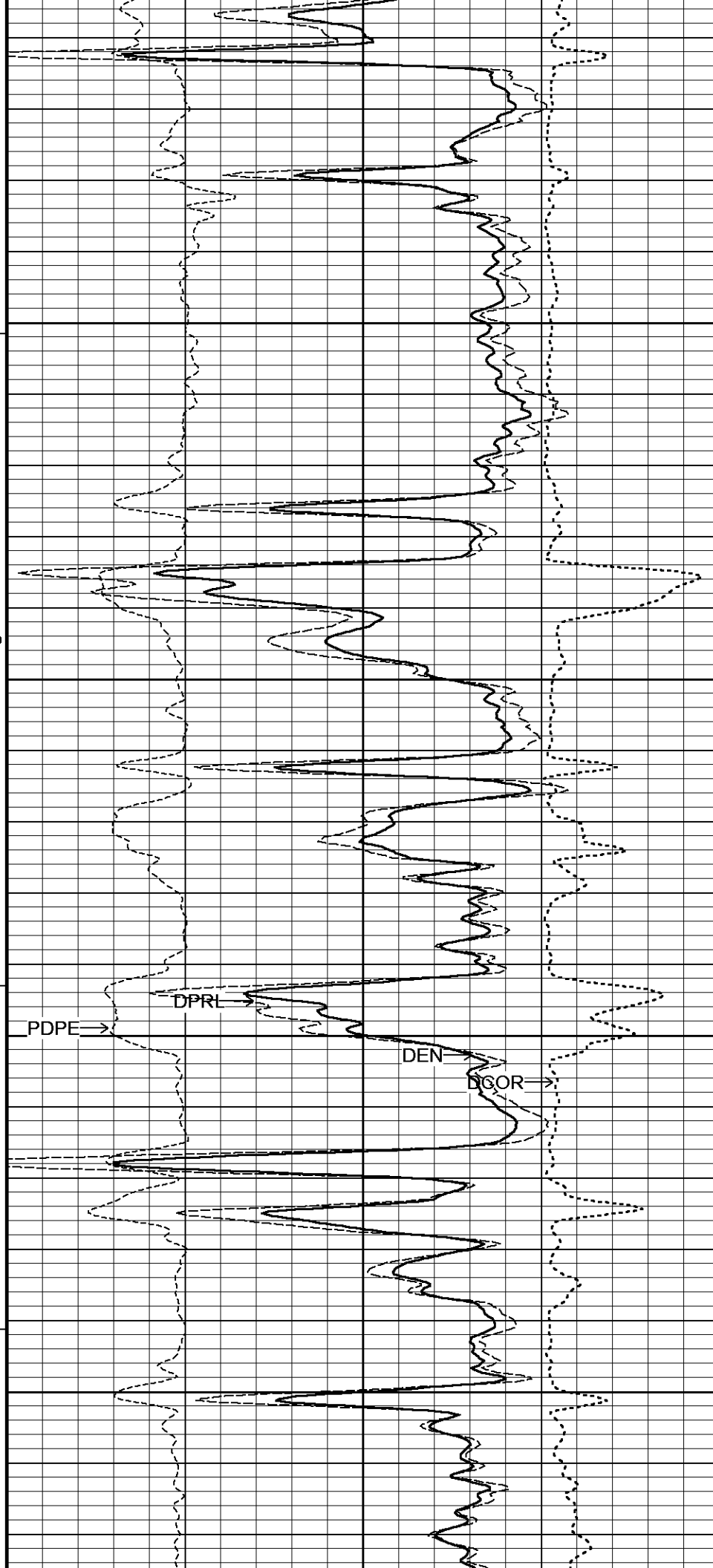
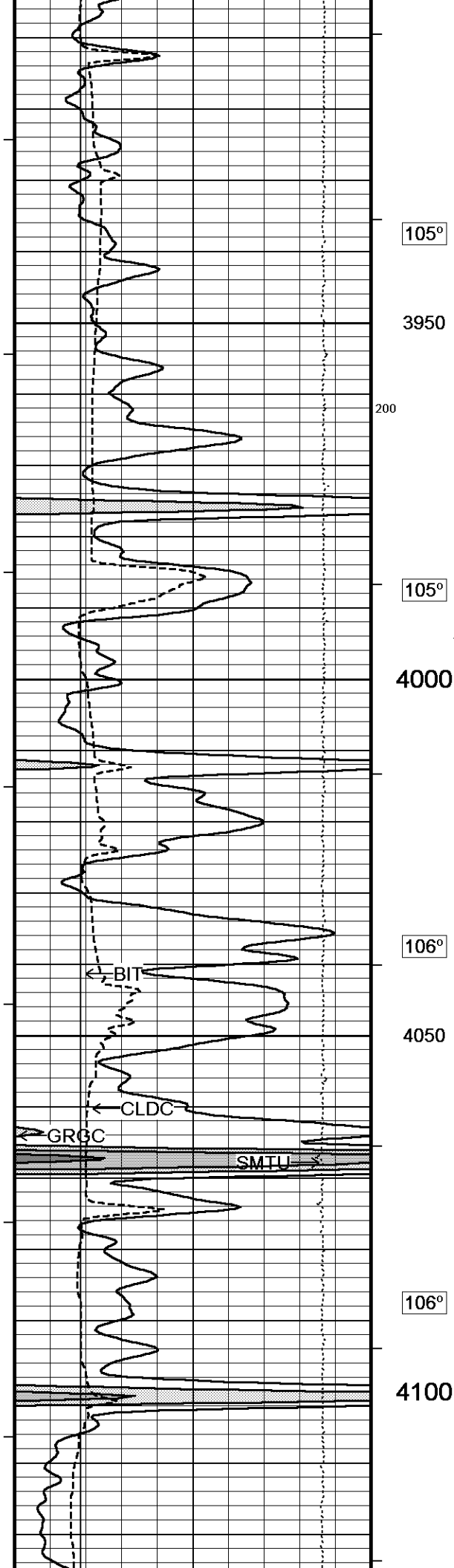
Filename: C:\Minimus 13.08.2113\Logs\Shakespeare Ottley #6-14\Shakespeare Ottley #6-14 Main.dta

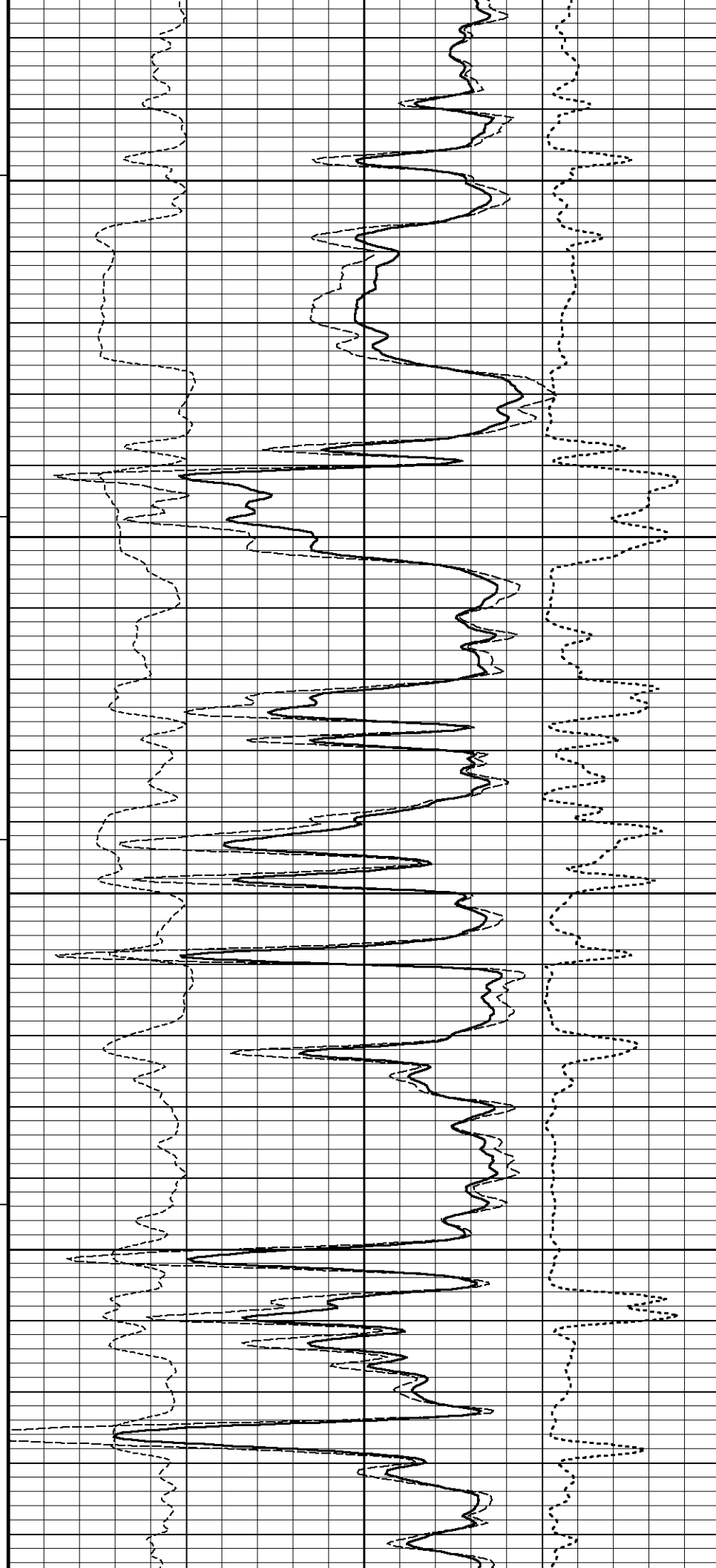
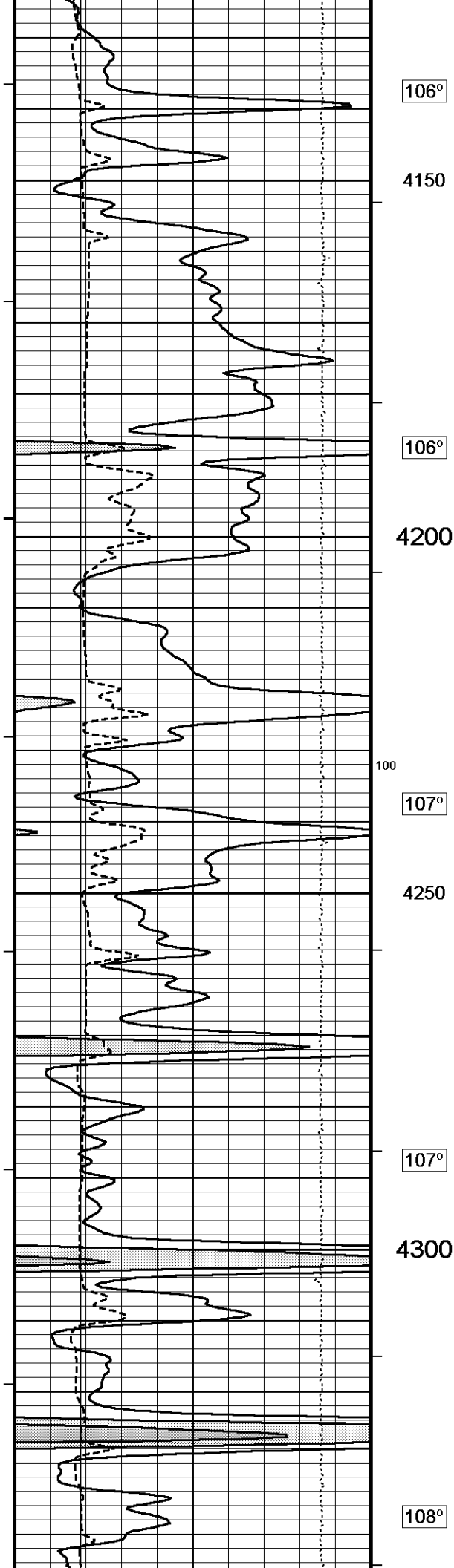
Recorded on 17-JUL-2014 14:12

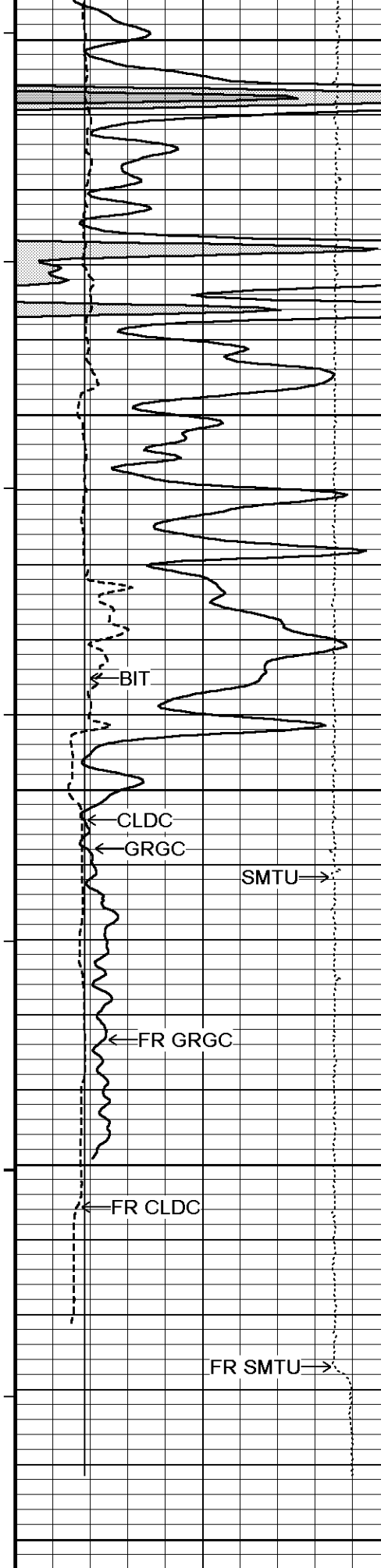
System Versions: Logged with 13.08.2113 Plotted with 13.08.2113











4350

109°

4400

110°

4450

109°

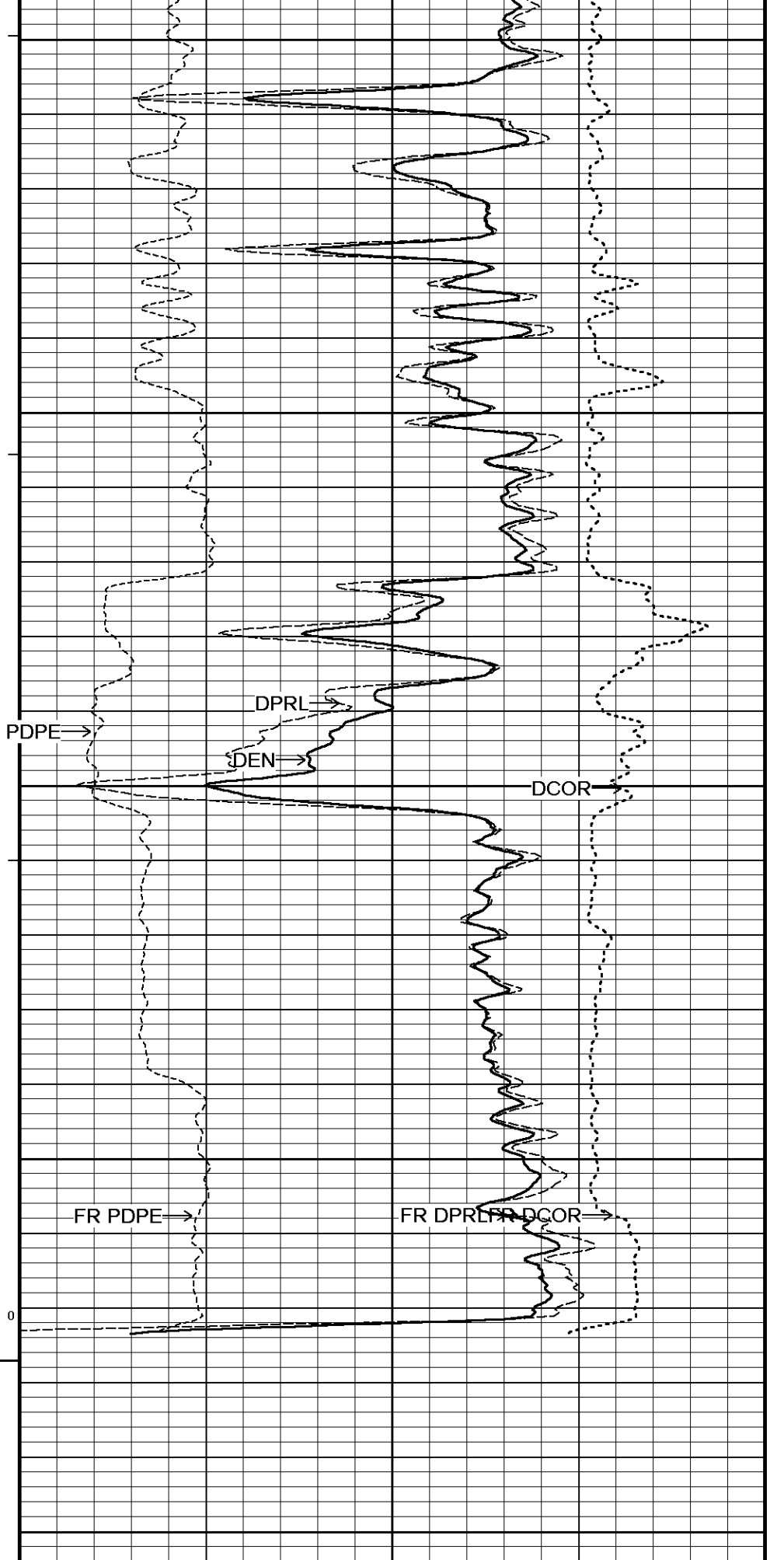
4500

0

TD

4550

Depth
in
Feet



PDPE

DPRL

DEN

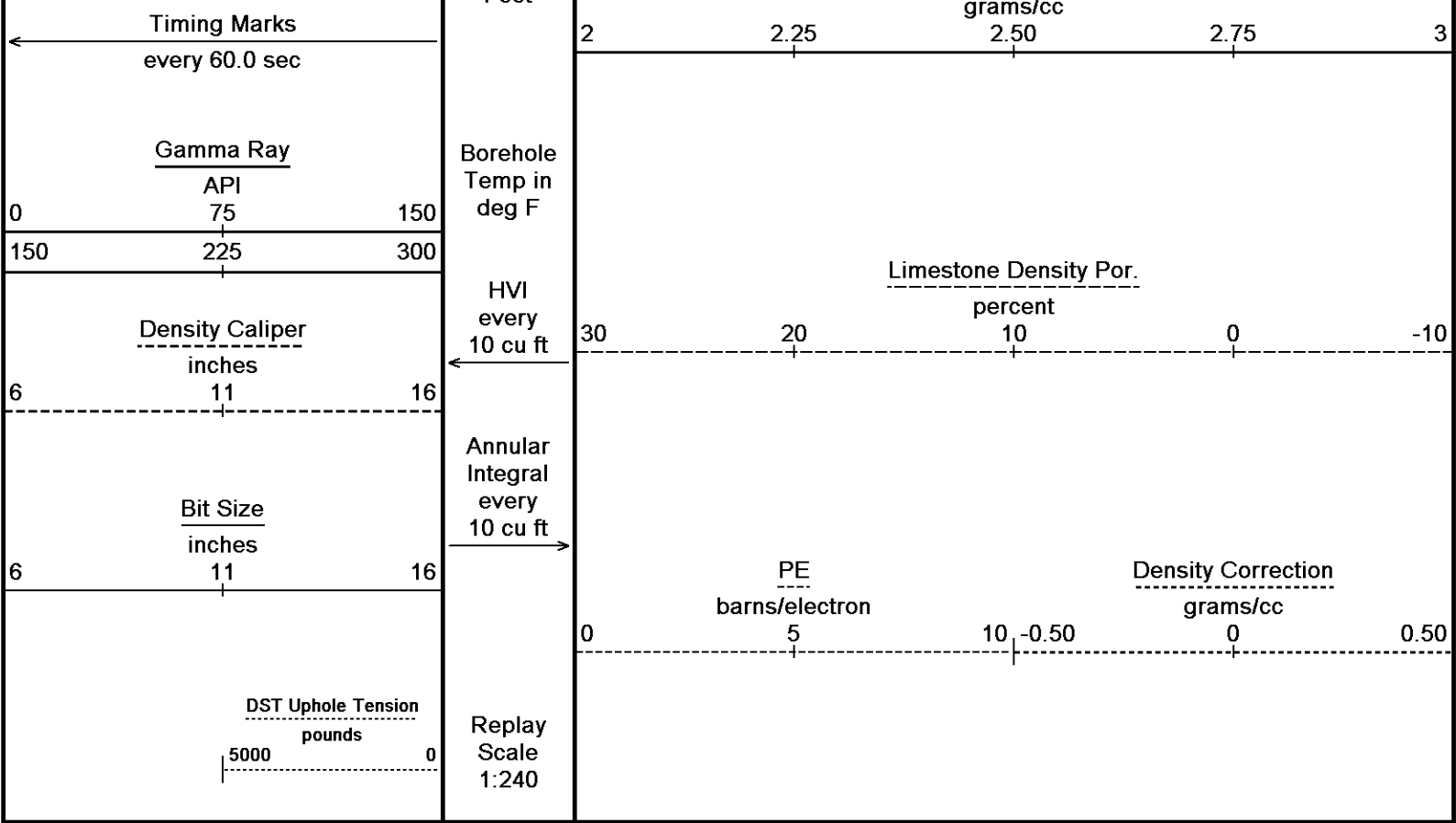
DCOR

FR PDPE

FR DPRL

FR DCOR

Compensated Density



Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 17-JUL-2014 17:01

Filename: C:\Minimus 13.08.2113\Logs\Shakespeare Ottley #6-14\Shakespeare Ottley #6-14 Main.dta

Recorded on 17-JUL-2014 14:12

System Versions: Logged with 13.08.2113 Plotted with 13.08.2113

↑

5 INCH MAIN BULK DENSITY

↑

↓

REPEAT SECTION

↓

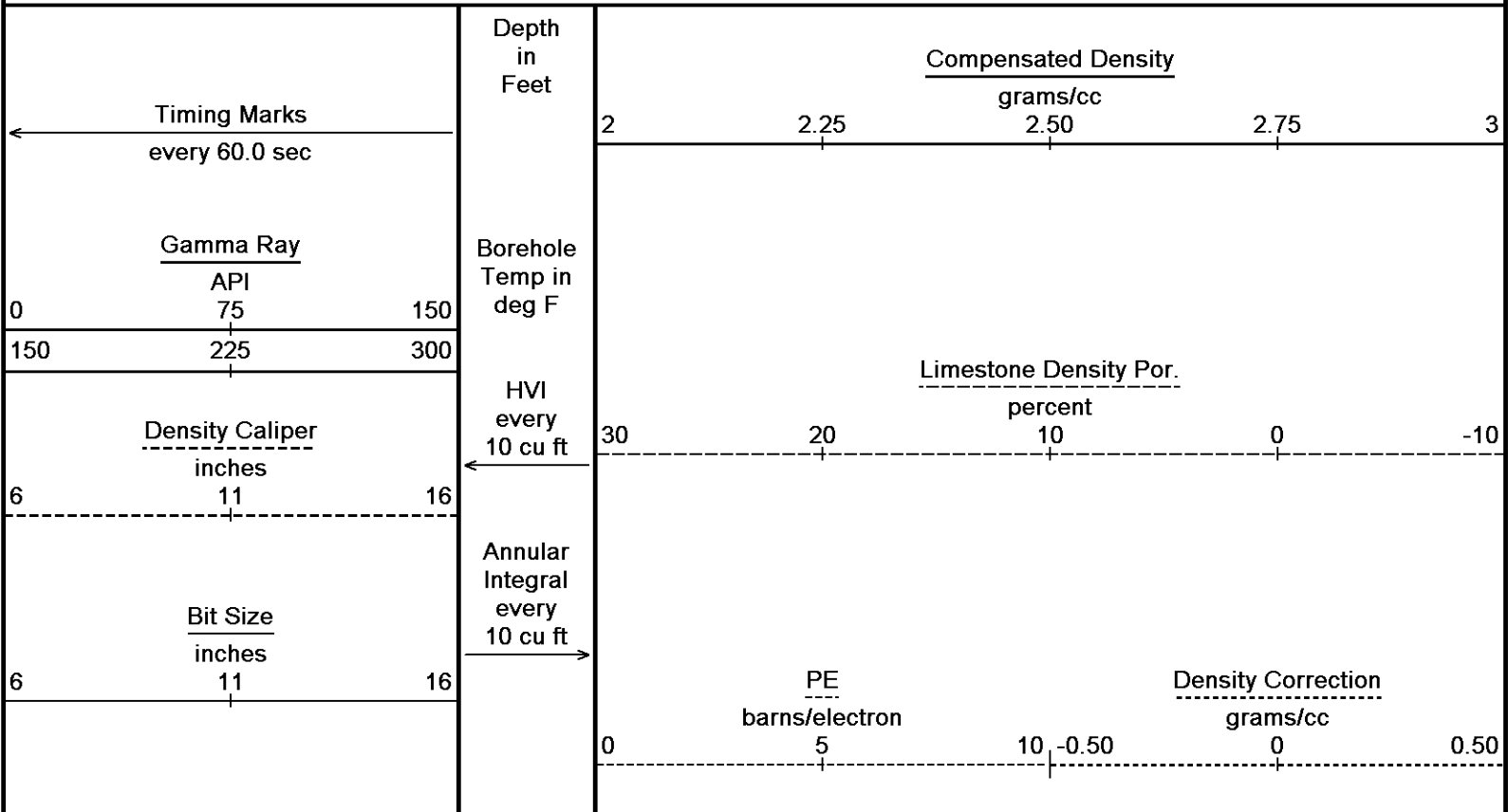
Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 17-JUL-2014 17:01

Filename: C:\Minimus 13.08.2113\Logs\Shakespeare Ottley #6-14\Shakespeare Ottley #6-14 Repeat.dta

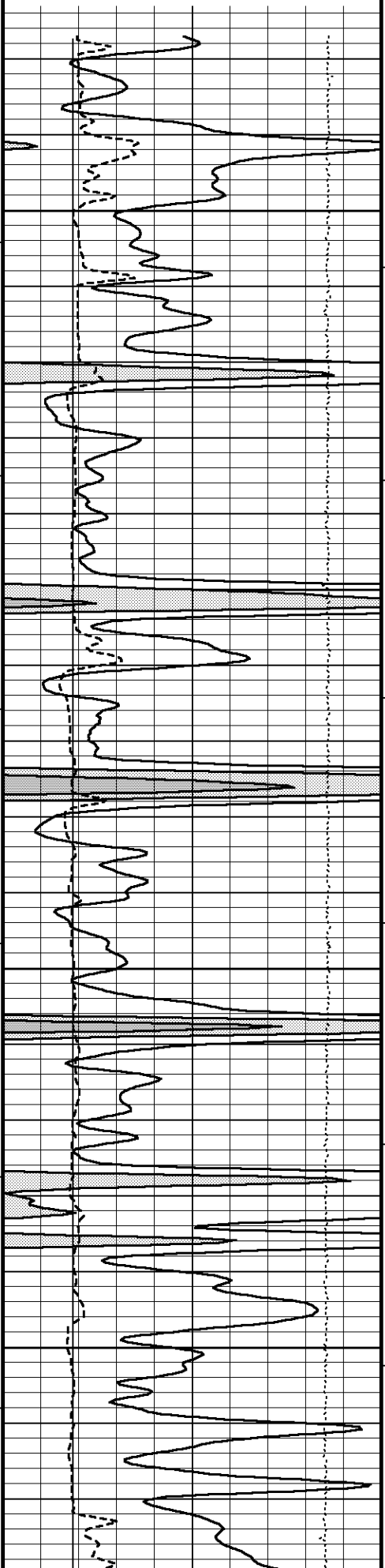
Recorded on 17-JUL-2014 13:55

System Versions: Logged with 13.08.2113 Plotted with 13.08.2113

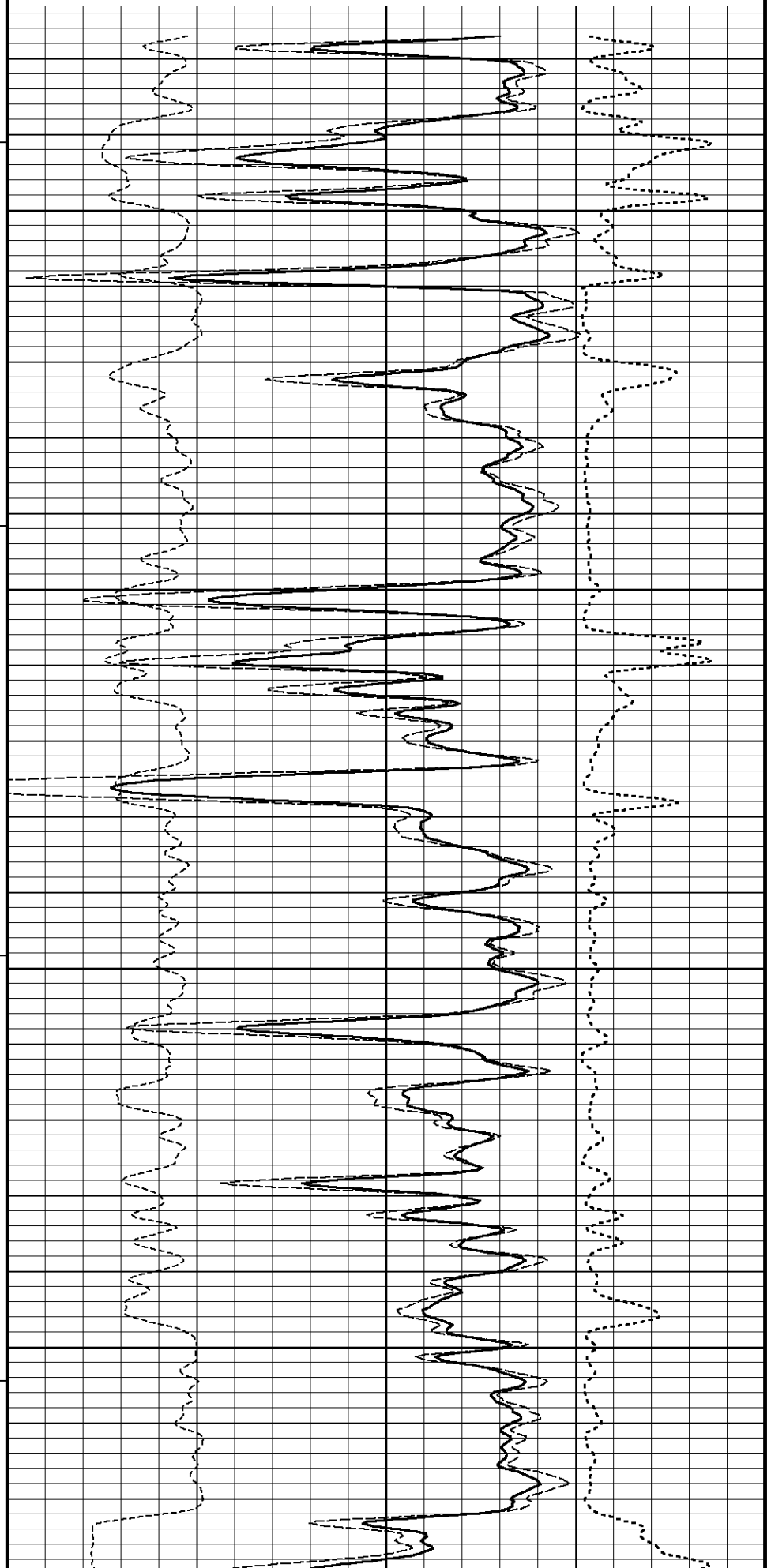


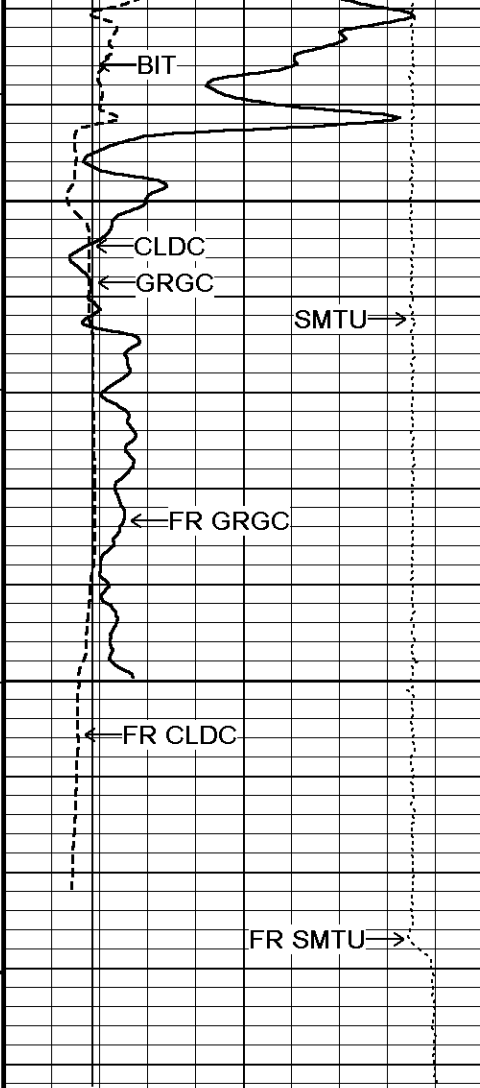
DST Uphole Tension
pounds
5000 0

Replay
Scale
1:240



4226
100
4250
106°
4300
107°
4350
108°
4400





Timing Marks
every 60.0 sec

Gamma Ray
API
0 75 150
150 225 300

Density Caliper
inches
6 11 16

Bit Size
inches
6 11 16

DST Uphole Tension

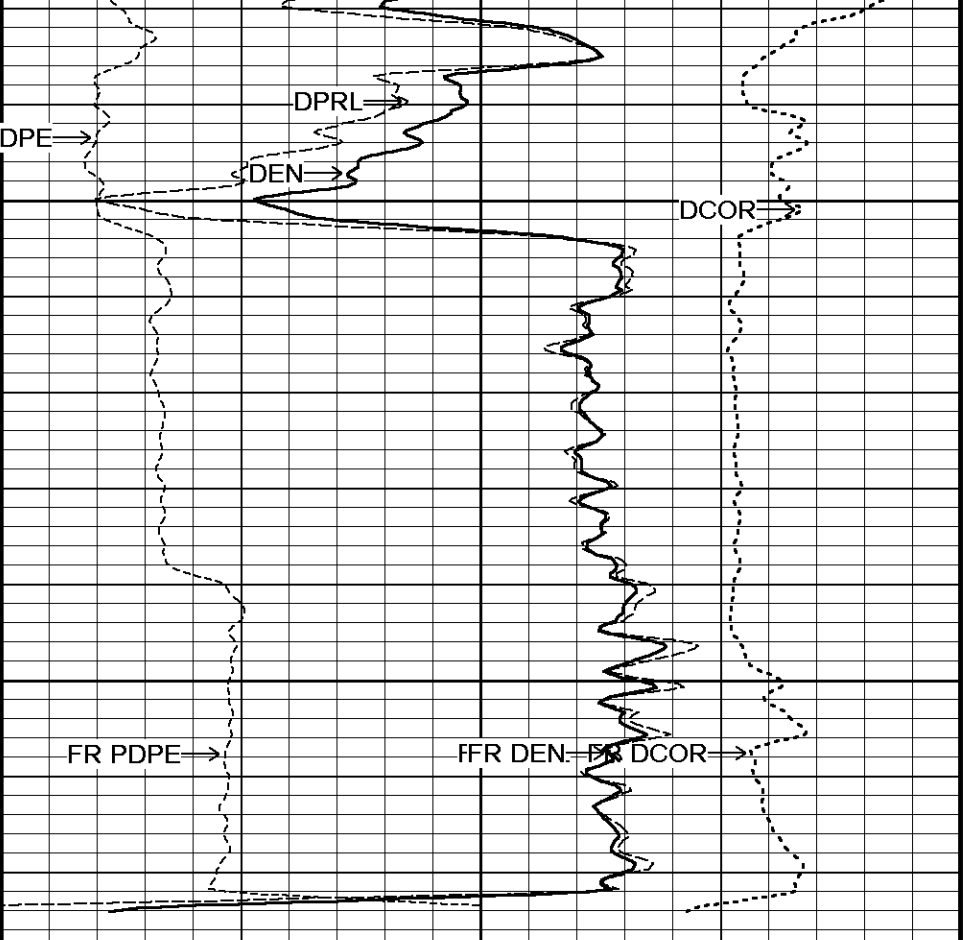
109°
4450
109°
4500
0
TD

Depth
in
Feet

Borehole
Temp in
deg F

HVI
every
10 cu ft

Annular
Integral
every
10 cu ft



Compensated Density
grams/cc
2 2.25 2.50 2.75 3

Limestone Density Por.
percent
30 20 10 0 -10

PE
barns/electron
0 5 10
Density Correction
grams/cc
-0.50 0 0.50

Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 17-JUL-2014 17:01
 Filename: C:\Minimus 13.08.2113\Logs\Shakespeare Ottley #6-14\Shakespeare Ottley #6-14 Repeat.dta Recorded on 17-JUL-2014 13:55
 System Versions: Logged with 13.08.2113 Plotted with 13.08.2113

↑ REPEAT SECTION ↑

BEFORE SURVEY CALIBRATION
 C:\Minimus 13.08.2113\Logs\Shakespeare Ottley #6-14\Shakespeare Ottley #6-14 Repeat.dta

General Constants All 000 Last Edited on 17-JUL-2014,11:25

General Parameters
 Mud Resistivity 0.720 ohm-metres
 Mud Resistivity Temperature 80.000 degrees F
 Water Level 0.000 feet
 Borehole Fluid Processing Wet Hole

Hole/Annular Volume and Differential Caliper Parameters
 HVOL Method Single Caliper
 HVOL Caliper 1 Density Caliper
 HVOL Caliper 2 N/A
 Annular Volume Diameter 5.500 inches
 Caliper for Differential Caliper Density Caliper

Rwa Parameters
 Porosity used Crossplot Porosity
 Resistivity used Array Ind. One Res Rt
 RWA Constant A 0.610
 RWA Constant M 2.150
 SW/APOR Tool Source 0.000

Down-hole Tension Calibration SMS 0 Field Calibration on 17-JUL-2014 13:03

Reading No	Measured	Calibrated (lbs)
1	14537.26	0.00
2	15240.93	407.90

Gamma Calibration MCG-D.K 442 Field Calibration on 13-JUL-2014 16:43

	Measured	Calibrated (API)
Background	69	46
Calibrator (Gross)	1158	771
Calibrator (Net)	1089	725

Gamma Constants MCG-D.K 442 Last Edited on 17-JUL-2014,11:25

Gamma Calibrator Number GRC038
 Mud Density 1.13 gm/cc
 Caliper Source for Processing Density Caliper
 Tool Position Eccentred
 Concentration of KCl kppm
 K Mud Type Chloride
 K Mud Concentration 0.00 %

High Resolution Temperature Calibration MCG-D.K 442 Field Calibration on 10-MAY-2014,10:22

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	75.00	75.00

High Resolution Temperature Constants MCG-D.K 442 Last Edited on 10-MAY-2014,10:22

Pre-filter Length 11

SP Calibration MCG-D.K 442 Field Calibration on 06-JUL-2014 15:10

	Measured	Calibrated (mV)
Reference 1	99.0	99.0

Reference 1	99.0	99.0
Reference 2	-98.7	-98.8
Caliper Calibration MMR-C.A 248		Base Calibration on 20-JUN-2014 09:22 Field Calibration on 13-JUL-2014 16:30
Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	13560	5.98
2	16725	7.97
3	19859	9.86
4	23840	11.92
5	0	0.00
6	N/A	N/A
Field Calibration		
	Measured Caliper (in)	Actual Caliper (in)
	8.01	7.97

Micro Normal and Micro Inverse Calibration MMR-C.A 248					Base Calibration on 20-JUN-2014 09:12 Field Check on 13-JUL-2014 16:31	
Base Calibration						
		Measured		Calibrated (ohm-m)		
Channel	Resistor 1	Resistor 2	Resistor 1	Resistor 2		
Micro Normal	9.9	49.5	5.1	25.6		
Micro Inverse	9.9	49.5	3.4	16.9		
Channel	Base Check (ohm-m)			Field Check (ohm-m)		
Micro Normal	93.9			93.9		
Micro Inverse	62.2			62.2		

Micro Normal and Micro Inverse Constants MMR-C.A 248			Last Edited on 23-JAN-2014,17:04		
Pad Type	8-12 in Soft Rubber Inflatable 006-9011-159				
Micro Normal K Factor	0.5110				
Micro Inverse K Factor	0.3380				
Standoff Offset	0.0000		inches		

Neutron Calibration MDN-B.J 387				Base Calibration on 26-JUN-2014 11:21	
				Field Check on 13-JUL-2014 16:49	
Base Calibration					
		Measured		Calibrated (cps)	
	Near	Far	Near	Far	
	2997	92	3714	110	
Ratio	32.443		33.764		
Field Calibrator at Base					
			Calibrated (cps)		
			1677	2452	
Ratio	0.684				
Field Check					
			Calibrated (cps)		
			1684	2457	
Ratio	0.682				

Neutron Constants MDN-B.J 387		Last Edited on 16-JUL-2014,03:38	
Neutron Source Id	P58125B		
Neutron Jig Number	5824NE		
Epithermal Neutron			
Caliper Source for Processing	Density Caliper		
Stand-off	0.00	inches	
Mud Density	1.00	gm/cc	
Limestone Sigma	7.10	cu	
Sandstone Sigma	4.26	cu	
Dolomite Sigma	4.70	cu	
Formation Pressure Source	None		
Formation Pressure	N/A	kpsi	
Temperature Source	Constant Value		
Temperature	68.00	degrees F	
Mud Salinity	0.00	kppm	
Salinity Correction	Not Applied		
Formation Fluid Salinity Source	None		
Formation Fluid Salinity	N/A	kppm	
Barite Mud Correction	Not Applied		

FE Calibration MFE-A.A 55

Base Calibration on 20-JUN-2014 09:41

Field Check on 13-JUL-2014 16:23

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	950.7	126.8
Base Check		281.7
Field Check		281.7

FE Constants MFE-A.A 55

Last Edited on 16-JUL-2014,03:38

Running Mode	No Sleeve	
MFE K Factor	0.1268	
Caliper Source for FE correction	Density Caliper	
Caliper Value for FE correction	N/A	inches
Rm Source for FE correction	Temperature Corr	
Temp. for Rm Corr.	MCG External Temperature	
Stand-off	0.5	inches

Induction Calibration MAI-A.A 5

Base Calibration on 21-JAN-2014,09:50

Field Check on 13-JUL-2014 16:22

Base Calibration

Test Loop Calibration	Measured		Calibrated (mmho/m)	
Channel	Low	High	Low	High
1	16.3	470.8	9.3	966.2
2	5.6	376.1	7.6	821.4
3	2.6	266.1	5.2	566.0
4	1.6	130.0	2.6	279.2

Array Temperature 71.1 Deg F

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1			15.9	3862.5
2			31.9	3589.9
3			29.8	2970.7
4			20.7	2125.6
Deep			18.5	1911.7
Medium			42.9	3860.1
Shallow			47.4	5371.3

Array Temperature 89.7 Deg F

Induction Constants MAI-A.A 5

Last Edited on 16-JUL-2014,03:41

Induction Model	RtAP-WBM	
Caliper for Borehole Corr.	Density Caliper	
Hole Size for Borehole Correction	N/A	inches
Tool Centred	No	
Stand-off Type	Fins	
Stand-off	0.50	inches
Number of Fins on Stand-off	8.0000	
Stand-off Fin Angle	45.00	degrees
Stand-off Fin Width	0.5000	inches
Borehole Corr. Rm Source	Temperature Corr	
Temp. for Rm Corr.	MCG External Temperature	
Squasher Start	0.0020	mhos/metre
Squasher Offset	N/A	mhos/metre

Borehole Normalisation

DRM1	0.0000	DRC1	0.0000
DRM2	0.0000	DRC2	0.0000
MRM1	0.0000	MRC1	0.0000
MRM2	0.0000	MRC2	0.0000
SRM1	0.0000	SRC1	0.0000
SRM2	0.0000	SRC2	0.0000

Calibration Site Corrections

Channel 1	0.00	mmhos/metre
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Channel 2	0.00	mmhos/metre
Channel 3	0.00	mmhos/metre
Channel 4	0.00	mmhos/metre

Apparent Porosity and Water Saturation Constants		
Archie Constant (A)	1.00	
Cementation Exponent (M)	2.00	
Saturation Exponent (N)	2.00	
Saturation of Water for Apor	100.00	percent
Resistivity of Water for Apor and Sw	0.05	ohm-m
Resistivity of Mud Filtrate for Sw	0.00	ohm-m
Source for Rt	0.00	
Source for Rxo	0.00	

High Resolution Temperature Calibration MAI-A.A 5			Field Calibration on 21-JAN-2014,15:43
	Measured	Calibrated(Deg F)	
Lower	50.00	50.00	
Upper	75.00	75.00	

High Resolution Temperature Constants MAI-A.A 5		Last Edited on 27-JUN-2014,14:12
Pre-filter Length	11	

Caliper Calibration MPD-D.A 480			Base Calibration on 26-JUN-2014 09:45
			Field Calibration on 13-JUL-2014 16:24
Base Calibration			
Reading No	Measured	Calibrator Size (in)	
1	18085	3.99	
2	28066	5.98	
3	38193	7.97	
4	47934	9.86	
5	58962	11.92	
6	N/A	N/A	
Field Calibration			
	Measured Caliper (in)	Actual Caliper (in)	
	7.96	7.97	

Photo Density Calibration MPD-D.A 480					Base Calibration on 14-JUL-2014 16:16
					Field Check on 14-JUL-2014 16:24
Density Calibration					
Base Calibration		Measured		Calibrated (sdu)	
	Near	Far	Near	Far	
Background	1272	1466			
Reference 1	57253	26627	59556	30836	
Reference 2	23358	2650	24941	2541	
Field Check at Base					
	1271.6	1465.6			
Field Check					
	1268.7	1468.0			
PE Calibration					
Base Calibration		Measured		Calibrated	
	WS	WH	Ratio	Ratio	
Background	239	1138			
Reference 1	24028	57044	0.426	0.371	
Reference 2	6966	23210	0.305	0.272	
Field Check at Base					
	238.9	1137.7			
Field Check					
	239.3	1131.3			

Density Constants MPD-D.A 480		Last Edited on 17-JUL-2014,11:26
Density Source Id	P50557B	
Nylon Calibrator Number	DNCE695	
Aluminium Calibrator Number	DACD698	

Density Shoe Profile	8 inch	
Caliper Source for Processing	Density Caliper	
PE Correction to Density	Not Applied	
Mud Density	1.13	gm/cc
Mud Density Z/A Multiplier	1.11	
Mud Filtrate Density	1.00	gm/cc
Dry Hole Mud Filtrate Density	1.00	gm/cc
DNCT	0.00	gm/cc
CRCT	0.00	gm/cc
Density Z/A Correction	Hybrid	

Matrix Density (gm/cc)	Depth (ft)
2.71	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00

DOWNHOLE EQUIPMENT

C:\Minimus 13.08.2113\Logs\Shakespeare Ottley #6-14\Shakespeare Ottley #6-14 Repeat.dta

CBH-C, Cablehead, 11 pin
CBH-C 0 LG: 2.40 ft WT: 24.3 lb OD: 2.244 in

Compact Comms Gamma
MCG-D.K 442 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Micro-Resistivity
MMR-C.A 248 LG: 8.59 ft WT: 81.6 lb OD: 4.882 in

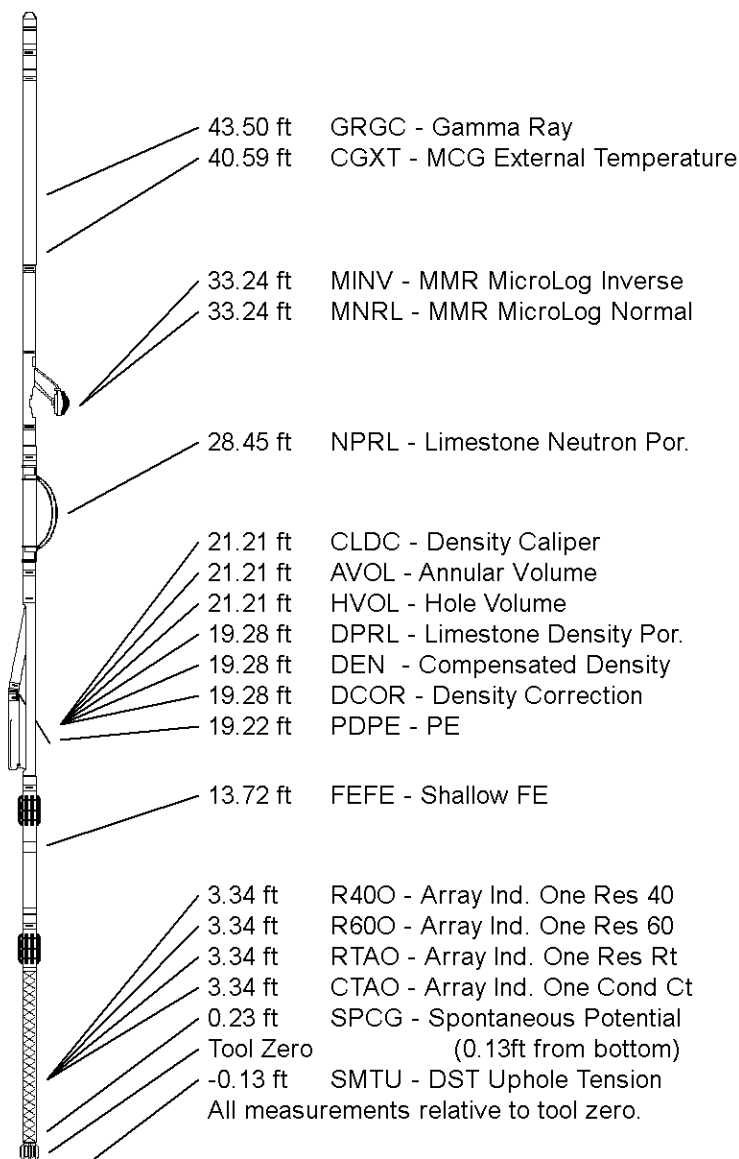
Compact Neutron
MDN-B.J 387 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

Compact Density/Caliper
MPD-D.A 480 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

Compact Focussed Electric
MFE-A.A 55 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

Compact Induction
MAI-A.A 5 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

Total Length: 51.18 ft Weight: 407.9 lb



COMPANY
WELL

SHAKESPEARE OIL COMPANY, INC.
OTTLEY #6-14

FIELD			CHALK BUTTES		
PROVINCE/COUNTY			LOGAN		
COUNTRY/STATE			U.S.A. / KANSAS		
Elevation Kelly Bushing	2819.00	feet	First Reading	4508.00	feet
Elevation Drill Floor	2817.00	feet	Depth Driller	4530.00	feet
Elevation Ground Level	2809.00	feet	Depth Logger	4527.00	feet
			COMPACT PHOTO DENSITY COMPENSATED NEUTRON MICRORESISTIVITY LOG		